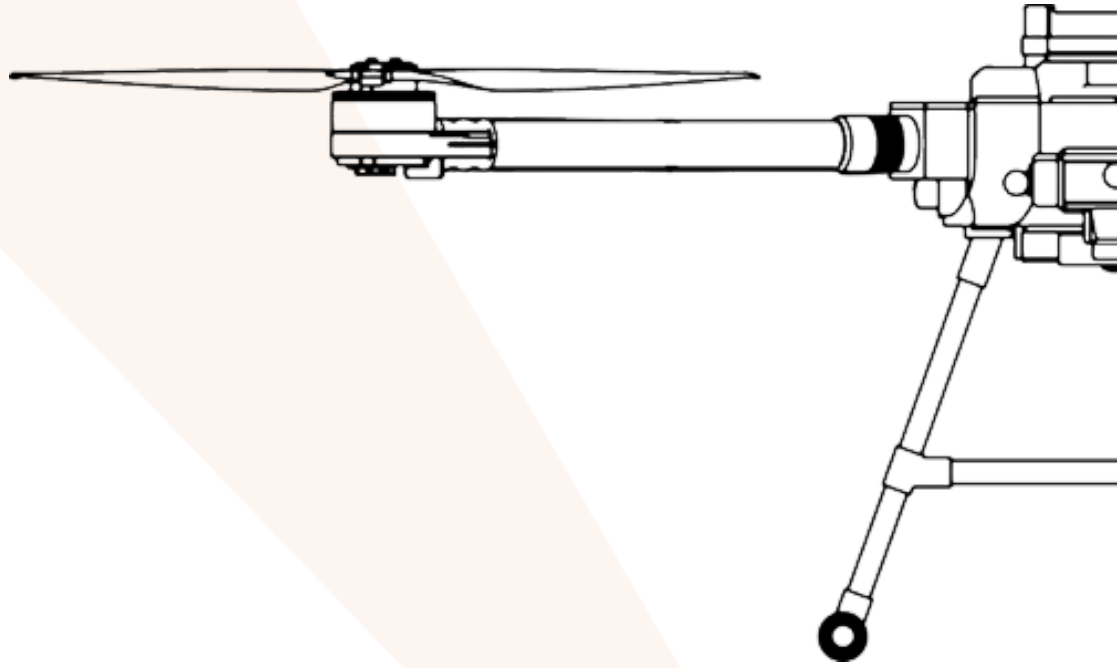




ABZ
INNOVATION
WE BUILD DRONES.



C10

OPERATOR MANUAL

Version 2.6

General Information

Overview

This manual is for the ABZ Innovation C10 cleaning drone, which can be upgraded with a high-pressure washing machine pipe as its payload.

The drone and its accessories may only be operated in accordance with the instructions in this manual.

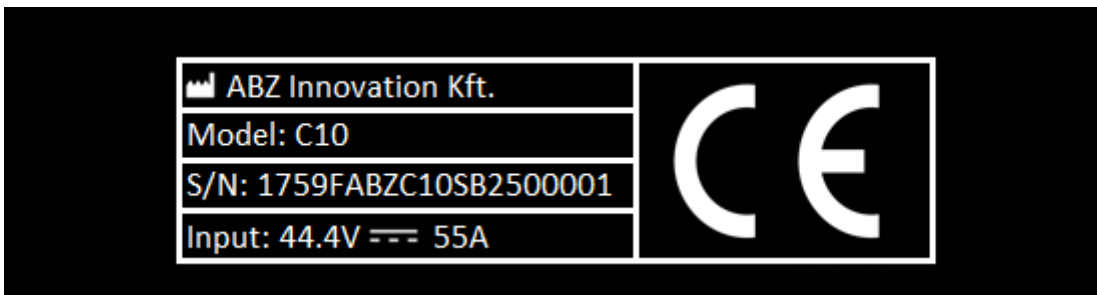
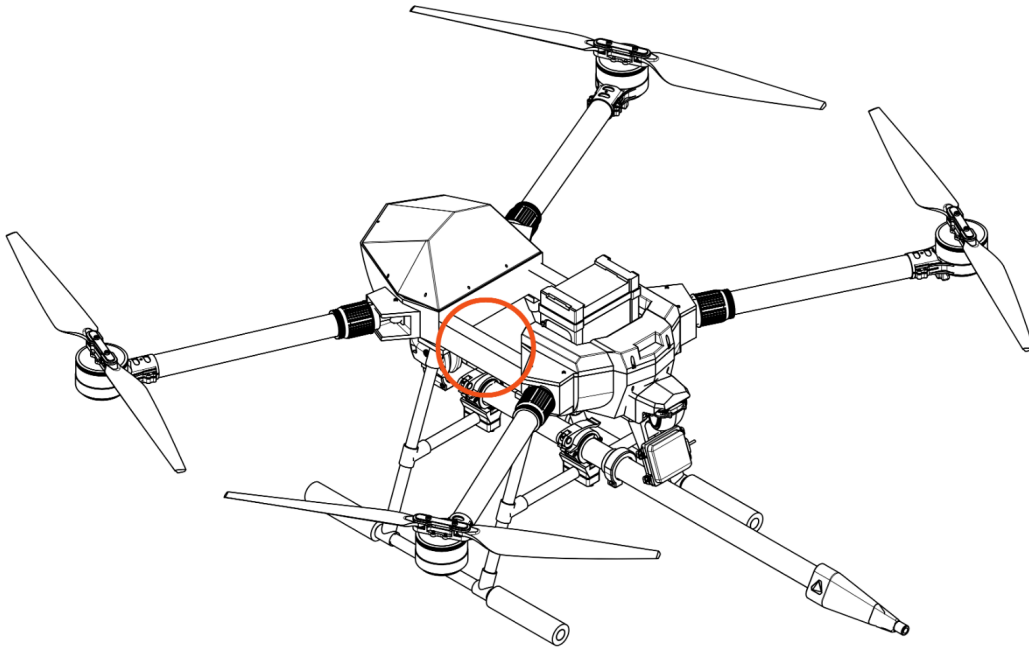
Please read this notice and the manual provided for your ABZ Innovation C10 drone before use. If you have any questions, please contact ABZ Innovation customer service before use. The contact details can be found at the end of this document. By using the drone, you declare that you have read this manual, that you understand and acknowledge the information contained herein, and that you consent to use the drone only under proper conditions, in full compliance with applicable laws and the instructions in this manual. Furthermore, you agree that you are now exclusively responsible for the drone and its operation, and for any direct or indirect legal consequences arising from its operation.

The ABZ Innovation C10 drone is NOT a toy and is to be used only with care. The ABZ Innovation C10 is a technical, industrial device. Improper use of the drone poses a serious risk and can cause damage to the drone and its surroundings, severe personal injury or death. The drone may only be used by qualified pilots. For optimal efficiency and safety, the drone should be operated by a team of two people.

Any modification to the drone, its components or software will immediately void the warranty.

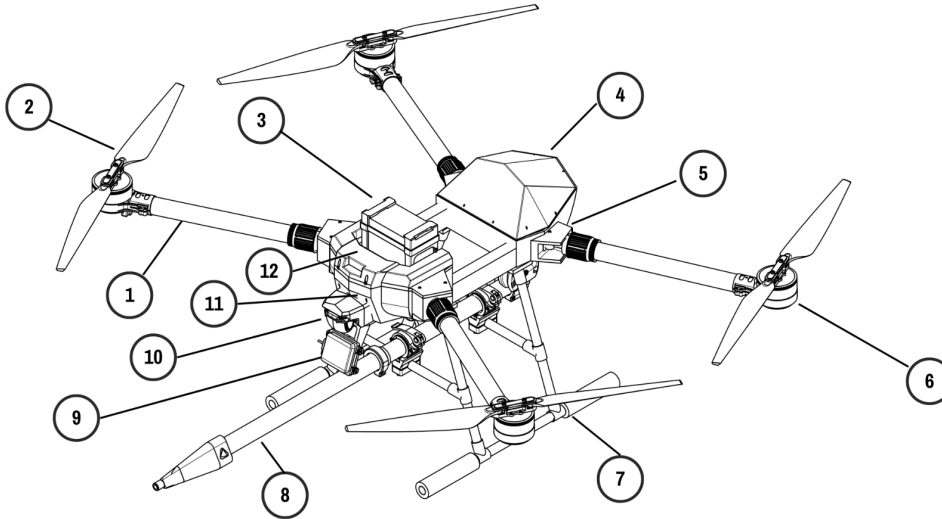
The drone can be purchased either as a standalone unit or equipped with the high-pressure washing system supplied by the manufacturer.

Customers must ensure that any chosen washing system complies with the drone's technical parameters. Failure to do so may result in operational failure, physical damage to the drone, and increased risk of personal injury.



To identify a C10, locate the serial number label on the right side of the drone frame and check if the „Model” is C10.

Drone main parts



1: Arms

2: Propellers

3: Battery

4: Rear cover

5: RC antennas

6: Motor

7: Landing gear

8. Cleaning lance

9: Radar

10: Camera

11: Front cover

12. Battery connector

The high-pressure washing system provided by the manufacturer is fully optimized for the drone's capabilities. The water-filled hose remains within the approved payload limits, and its length supports effective operation at washing heights of up to 60 meters.

Customers must ensure that any chosen washing system complies with the drone's technical parameters. Failure to do so may result in operational failure, physical damage to the drone, and heightened risk of personal injury.

Packing list

The C10 drone standard package contains:

- C10 drone
- Drone lance
- Standard and tilting nozzle holder
- ABZ Innovation MK15 remote controller with sticks and antennas
- 20 W fast charger and cable for remote controller
- US/EU plug converter for the fast charger
- USB-C / USB-A converter
- Carrying case for the remote controller

Specifications

UAS category classification	C5 (valid only for the C10 drone as a complete system)*
Max. Take-off Mass (MTOM)	24,9 kg (55 lbs)
Drone empty weight	11,75 kg (25,9 lbs)
Max. payload weight (Includes the maximum weight of the pipe that can be lifted. The pilot should consider the water's weight inside the pipe.)	8,95 kg (19,7 lbs)
Max. summarized weight of accessories and batteries and payloads	13,15 kg (29 lbs)
Battery weight	4,2 kg (9,3 lbs)
Washing lance (Part number: P001420.01) Weight: Base length: Extended length: Tube inner diameter: Hose Weight with water Length: (Part number A001175.01) (Part number A001176.01)	1,58 kg (3,5 lbs) 1200 mm (47,24 in) 1400 mm (55,12 in) 37 mm (1,46 in) 119,6 g/m (0,663 lbs/100 in) 30m (98,43 ft) 60 m (196,85 ft)
Dimensions (arms, propellers unfolded) with spray lance	2060 x 1600 x 600 [mm] (81,1 x 63 x 23,6 in)
Dimensions (arms, propellers folded) with spray lance	1170 x 540 x 600 [mm] (46,1 x 21,3 x 23,6 in)
Dimensions (arms and propellers folded) without spray lance	770 x 540 x 600 [mm] (30,3 x 21,3 x 23,6 in)

Flight precision	GPS/RTK
Battery integration	Quick connector
Drone frame	Folding frame
Range of RC	~ 3,5 km (~ 2,2 mi)
Flight speed (working)	3m/s (6,7 mph)
Airspeed (maximum)	13m/s (29,1 mph)
Maximum bank angle	32°
Max climb rate	2m/s (4,5 mph)
Max. descent rate	1 m/s (2,2 mph)
max vertical speed at landing	0,5 m/s (1,1 mph)
Max. tolerable wind speed	10m/s (22,4 mph)
Radio Control and Telemetry band	2,4 GHz
Radio Control Telemetry Power	20 dB
Method of Modulation	Frequency
WLAN frequency band	2,4 GHz
Guaranteed sound power	106.9 dB

***The C5 category classification is valid only for the C10 drone as a complete system, including the spray lance (P/N:P001420.01) with the hose installed and provided by ABZ Innovation, and the 30 m (P/N: A001175.01) and 60 m (P/N: A001176.01) hoses supplied by ABZ Innovation.**

Safety requirements

Child protection provisions

- This equipment is not suitable for use in places where children are likely to be present.
- The equipment must be kept out of the reach of children.
- The equipment operates rotating parts that are dangerous for children and must be kept out of the reach of children!

Operating conditions

- The ABZ Innovation C10 drone is designed for daytime operations. The drone must not be operated at night.
- For optimal efficiency and safety, drones should be operated by a team of two people.
- It is forbidden to operate the drone or any of its components in an enclosed space.
- In all flight modes including take-off and landing, the pilot must comply with all safety requirements and the technical conditions must be met.
- Do not fly over or near people.
- When recording a video or picture, the privacy and property rights must be met. Recordings are only allowed with authorization of every involved person, including private property.
- The operator must use a Drone Remote Identification (RemoteID) device to comply with legal requirements.
- Maintain flight altitude below 60 m (66 yd) above ground level.
- Fly only in moderate weather conditions, between temperatures of 5°C and 45°C (41°F and 113°F).
- Do not fly in rain, hail, or in higher relative humidity than 80%.
- Avoid contact with any solid objects or animals during flight, even smaller particles (excessive sand, dust, or swarm of insects) can cause damage to the propellers, when contacting at high (rotational) speed.
- The pilot must ensure that during the entire flight, VLOS conditions are assured. Flight in excessive fog, dust, etc. is prohibited.
- In dark lighting conditions the pilot must reduce the maximum flight distance to a limit, where the drone and its orientation is safely determined based on the light of the LEDs.
- Your flying activities must not violate any applicable laws or regulations. You must have all necessary permits. Contact the appropriate government agency or authority before flying to ensure that you are operating your drone in compliance with laws and regulations.

Operation

- The drone may only be switched on and operated in accordance with the "Flight Protocol" chapter starting on page 61.
- Only use the drone in full compliance with the checklists.
- Stay away from rotating propellers and motors.
- Do not exceed the maximum combined accessories and batteries and payload weight in any case. Otherwise, the drone may be damaged and the flight might pose danger.
- Always keep the drone within visual line of sight (VLOS) and keep an eye on it.
- Don't get distracted by using your mobile phone or any other activities.
- Don't fly under the influence of alcohol, drugs or medicines. Fly only when you are mentally and physically capable of safely controlling the drone, including paying attention to its surroundings.
- If the drone or remote controller battery is low, land the drone in a safe place. The state of the drone battery should be monitored before the flight using the charging indicator LEDs on the battery. We recommend starting the flight with a minimum of 80% battery charge.
- During the flight, the pilot must monitor the battery voltage, which should always be above 43.5V, even when flying with the Maximum Take-off Mass (MTOM). The ABZ Control battery indicator icon serves only as an indicator and shows an approximate value. If, during the return, the battery voltage reaches the low or critical threshold (42.5 V and 42 V), the drone will automatically initiate the battery failsafe procedures.
- Never fly closer than 100m (328,1 ft) of a high voltage power line or high-power radio emitters (e.g. Radar, TV/Radio station).
- After landing, switch off the motors, switch off the drone by disconnecting the battery, and then switch off the remote controller.

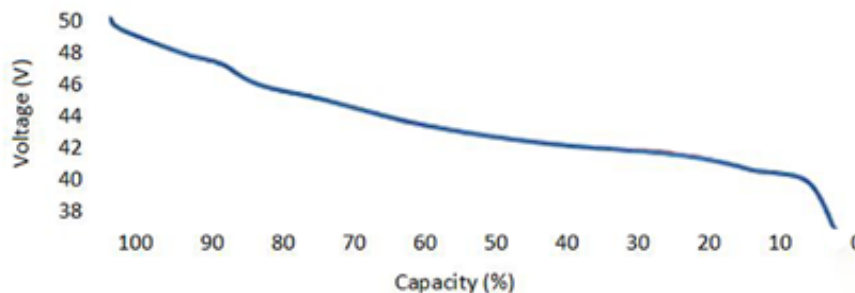
Maintenance and storage

- Do not use damaged, broken, or aged propellers.
- Regularly check the condition of the drone and make a flight log.
- To avoid damage to the drone's landing gear, remove payloads, accessories and the battery before transportation.
- Clean the drone, especially the propellers, after use.
- Recommended storage temperature: between 5°C and 40°C (41°F and 104°F) applicable for the drone, as well as the remote controller and the batteries.
- Never store the remote controller or the drone's batteries below 0°C (32°F), it will cause excessive degradation to the battery cells.
- Store the drone, remote controller, and batteries below 60% relative humidity.
- The remote controller and the drone's batteries must be stored at about 60% charge.
- Batteries deplete after extended storage. The remote controller and the drone's batteries must be discharged and recharged every 3 months of storage.
- After long-term storage:
 - Every battery must be inspected and fully charged before use.
 - The drone's motors must be inspected for free rotation.

Drone handling and use precautions

- Before commencing each flight, plan your drone's flight path with care and attention. Pay attention to the following:
 - working at a suitable time of day,
 - weather conditions,
 - environmental influences (such as sunlight),
 - drifting of the drone in case of wind,
 - wind speed,
 - flight altitude,
 - Make sure there are no obstacles in the work area between the pilot and the operated drone.

- The equipment is powered by a replaceable battery. Make sure the batteries are in good condition and fully charged. Do not use faulty or damaged batteries. To learn about proper use and storage, please read the battery's instruction manual.
- The batteries can be charged using an external battery charger. To use this, please refer to the battery charger's instructions for use.
- The battery performance varies by the temperature, always pay attention to this phenomenon and follow the battery's instruction manual. Operate or charge the batteries only between 5°C and 45°C ((41°F and 104°F) ambient temperatures, while the battery's temperature remains between 10°C and 60°C (50°F and 140°F) .
- Battery discharge is not linear, depending on load, temperature, internal resistance, and condition of cells. This figure shows the typical discharge curve for a drone battery in 90% state of health, at 40°C (104°F) at 7,5 C load:



- The maximum masses of accessories/batteries/payloads combined, fitted to the drone must not exceed 13,15 kg (29 lbs), thereby the drone's overall mass must not exceed the Maximum Take-off Mass (MTOM), 24,9 kg (54,9 lbs).
- The drone's maximum flight time with a single battery is primarily determined by its Take-off Mass, which is directly affected by the hose's filled length and the operational altitude. Under standard operating conditions, a single battery delivers approximately 18 minutes of flight time.
- Payloads—especially an attached lance—can significantly affect the drone's stability and maneuverability. Pilots should exercise increased caution, as these changes may result in slower response times during acceleration, braking, turning, and altitude adjustments.

Information about transport

The drone is designed for outdoor work. The drone can be delivered to the site in the trunk of a vehicle, in the loading area of a truck, or in a trailer. Always apply the protective foam fixations to the propellers before moving the drone with folded arms. Proper anchorage is an important prerequisite for the safe transport of the drone, as it is done on uneven road surfaces and on various terrains. Securing the drone improperly can cause damage such as deformation and ultimately breakage of the propellers, damage, punctures, damage to the fastenings, payloads, etc...

Transporting the equipment requires extra care and attention. Improperly secured equipment and accessories necessary for its operation (drone, drone batteries, battery charger, generator, etc...) can lead to damage, which may ultimately lead to total equipment failure. Therefore, please carefully secure the drone during transport and store its accessories in a suitable place.

In case of loss of signal and communication

General Failsafe

The ABZ Innovation C10 drone's software is equipped with safety features that ensure safe operation at all times. These include possible loss of signal and communication. This can occur when the drone signal is out of range, obstructed by a hill or building, or affected by interference from nearby equipment, electronic devices, or magnetic sources. In these cases, the drone will communicate clear instructions to the operator while the software initiates safety functions. The safety features [can be set before take-off](#), telling the drone what to do if the drone loses signal.

These options can also be set with the following:

- Returning to the starting point (Return to Launch – RTL)
- Landing
- continuing Auto mission

If the drone loses signal from the remote controller, or the communication between these are interrupted, on the remote controller's screen the following message will appear: „COMMUNICATION LOST” and it will read it out loud (if the volume is not muted).

The drone and the remote controller will try to recover the connection automatically. However, if possible, it is highly recommended for the pilot to move the remote controller closer to the drone, especially if any obstacles (e.g. building, tree, or a hill) are in between, and also if the communication between the remote controller and the drone is recovered, take back manual control of the drone (e.g. switching to Manual (Loiter) mode).

Low Power Condition

Battery Failsafe

The C10 drone is equipped with safety procedures to ensure that it operates only with safe battery levels. If the battery voltage reaches the low threshold (42.5 V), the drone will automatically initiate Return-to-Launch (RTL) mode. If, during RTL, the battery reaches the critical threshold (42 V), the drone will land immediately. In land mode, the pilot can only give forward, rearward (pitch), left, and right (roll) stick inputs to make sure that the landing is safe.

Regardless of the battery failsafe system in place, the pilot must continuously monitor the battery voltage during flight. The voltage should remain above 43.5 V, even when operating at Maximum Take-Off Mass (MTOM).

In the event of a crash, the drone typically disarms itself. However, if the rotors are still spinning, the pilot should attempt to activate the Motor emergency stop (by pressing the C and D buttons simultaneously), even if the 'Communication Lost' message is displayed.

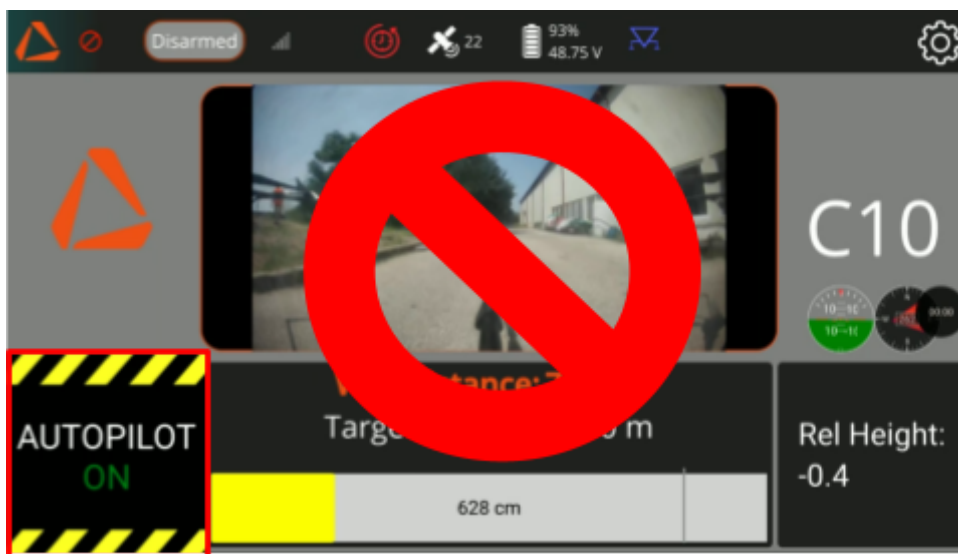


Never approach an armed drone!

Operational Safety

Understanding the environmental and equipment-related factors that can impact your C10 washing drone's performance is crucial for safe and effective operation.

Due to the emergency push function, it is dangerous to attempt take-off or landing with the Automatic Distance Control System activated. Never arm the drone, attempt to take off, or initiate landing while the system is active.



- **Always** ensure that the system is in Manual mode before arming the drone and taking off. Before landing, always switch to Manual mode.
- **Drone Stability in Wind:** While the C10 platform handles constant wind speeds well, strong gusts can displace the drone by 10-30 (3,9-11,8 in) cm before it can compensate. Always account for this potential instability. For optimal conditions, you should operate in calm weather or with light, steady winds. The recommended wind strength is less than 30 km/h (18,6 mph).
- **Water Jet Focus in Wind:** Increasing wind speeds significantly weaken the focus of the high-pressure water jet. In windy conditions, the cleaning effect becomes ineffective at distances beyond 20-30 cm (7,9-11,8 in) from the nozzle. If you observe this loss of focus, the wind speed is too high for safe operation. You must immediately stop the washing process.
- **Wall Surface Integrity:** Leaky, broken, or incomplete wall surfaces can weaken the radar signal, which can negatively impact the drone's automatic distance-keeping capabilities. As a solution, if radar-based ranging becomes unreliable, an experienced pilot may need to switch to manual flight operation.

- **Protruding Obstacles:** Be aware of any obstacles protruding from the wall surface, such as vents, signs, or structural elements. These can interfere with the drone's flight path or entangle the hose.
- **Hose Entanglement:** Hose entanglement during flight is a significant safety hazard. The best practice is to ensure the hose is always free of knots and can move without restriction in all directions before and during operation.
- **Hose Weight and Altitude:** As the drone ascends, the increasing weight of the extended hose creates a greater downward force and can affect the drone's responsiveness due to inertia. To minimize this effect, it is recommended that operations stay below a 30 m (98,4 ft) altitude.
- **Hose Position and Lateral Force:** The position of the high-pressure washing system on the ground relative to the drone can cause the hose to exert a lateral (sideways) pull. This can cause the drone to rotate unexpectedly, which is a safety hazard, especially when operating close to a surface.

For optimal positioning to minimize lateral pull, mark a 6-8 m (19,7-26,2 ft) wide section of the wall to be washed and position the hose system in the middle of that section on the ground. Keep the drone within a +/- 3-4 m (9,8-13,1 ft) horizontal range from the ground system's position as you move up and down the washing area.

Mandatory Remote identification with Dronetag

For security reasons, remote identification of drones is mandatory in the United States and the European Union. All drones must be equipped with a Remote Identification device to locally transmit information about the operating drone.

The C10 V2 drone comes equipped with a Dronetag DRI Remote ID module and meets the requirements of the legislation of the European Union¹ and the United States².

The Remote ID of your drone is its serial number, which is broadcast from the device during flight. The drone's system prevents takeoff if the Remote ID is not functioning.

The **RID icon** shows the operational status of the Remote ID system. If the icon is green, the Remote ID is broadcast correctly.



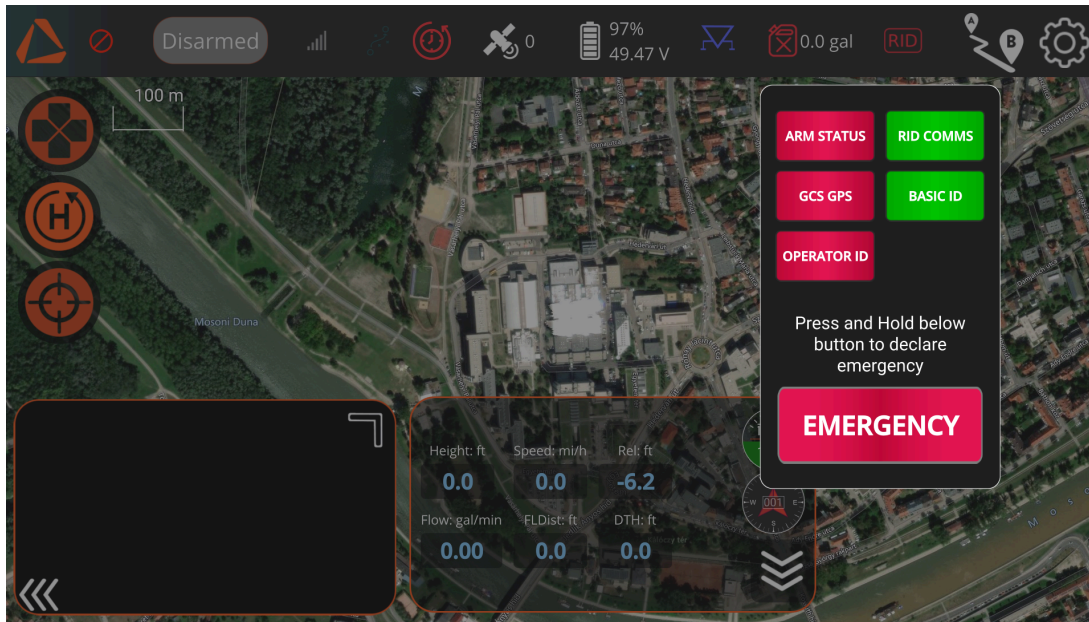
If the RID icon is red, it indicates that the Remote ID broadcast is not functioning properly.



¹ Commission Implementing Regulation (EU) 2019/947 (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0947>)

² 14 CFR Part 89 – Minimum Performance Requirements for Standard Remote Identification of Unmanned Aircraft (<https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-89>)

By clicking on the icon, you can check the health of the systems providing the necessary data for the Remote ID module.



The **ARM STATUS** field provides feedback about the proper functioning of the location source hardware and software of the drone. In the case of a malfunction, this icon will turn red, and consequently, the Remote ID icon will also turn red, indicating a malfunction in the Remote ID system. The drone will also provide an error message stating that the Open Drone ID has encountered a problem (e.g., not receiving a location message).

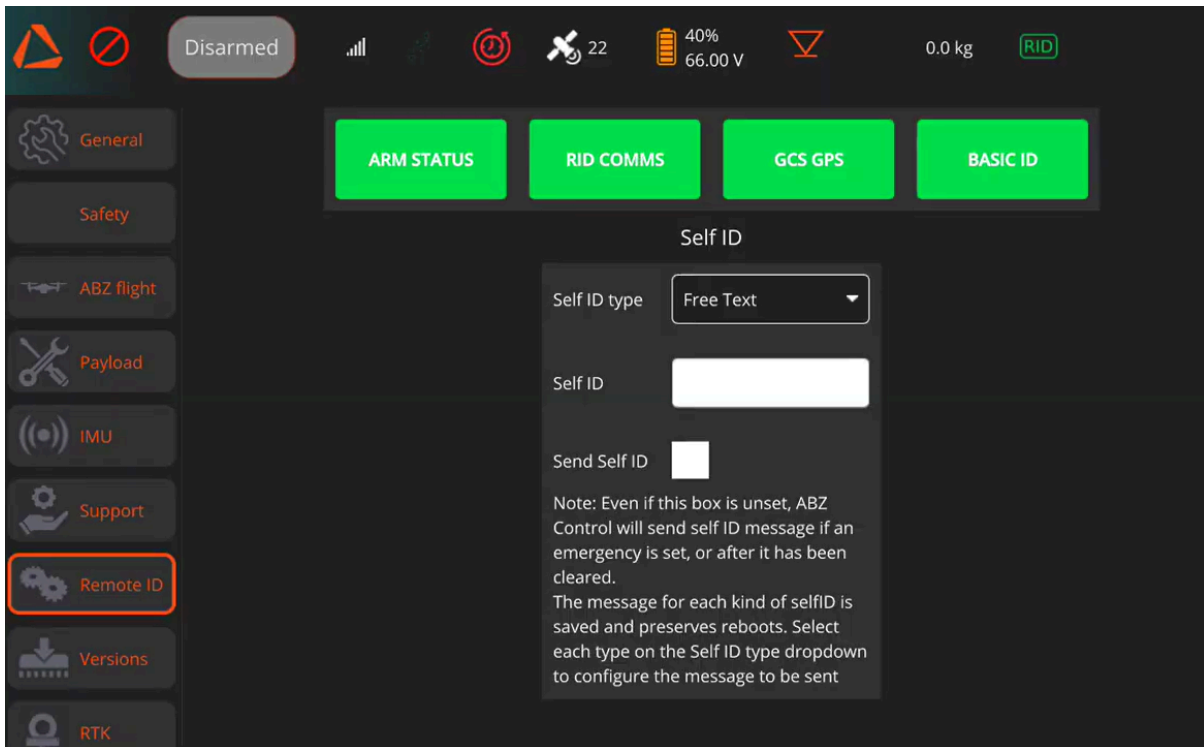
The **GCP GPS** field provides feedback about the proper functioning of the Transmitter radio GPS (hardware and software). In the case of a malfunction, this icon will turn red, and consequently, the Remote ID icon will also turn red, indicating a malfunction in the Remote ID system. The drone will also provide an error message stating that the Open Drone ID has encountered a problem (e.g., not receiving a location message).

The **RID COMMS** field provides feedback on the proper connection between the Remote ID module and the drone.

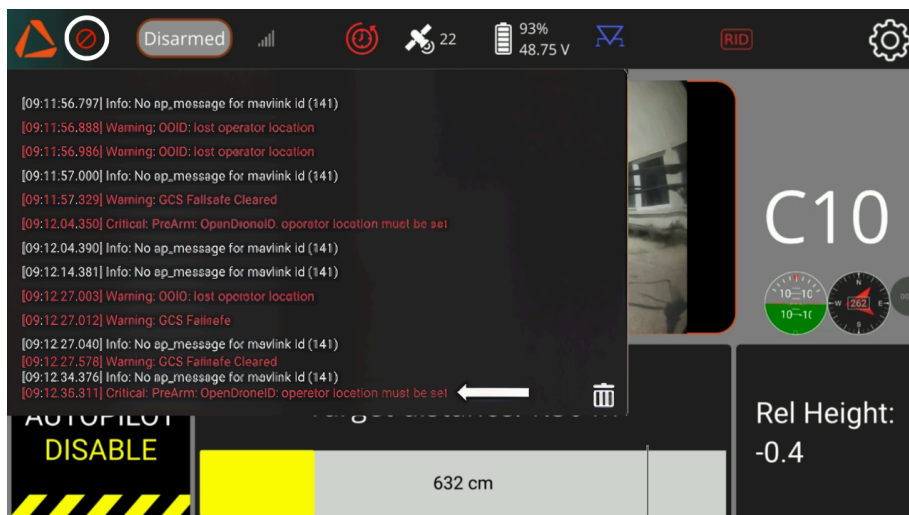
The **BASIC ID** field should always be green, indicating that the drone's serial number has been set up as Remote ID and is broadcasting. **If the Remote ID system experiences an error due to insufficient GPS coverage on the drone or the remote controller, or a hardware malfunction, the drone prevents arming.**

If you are flying in the **European Union**, the **Operator ID** field should be visible, and your Operator ID must be entered into the system. In the European Union, it is mandatory to register

as a drone operator on the official website of your National Aviation Authority. After registration, you will receive a registration ID number, which you can enter under *Settings > Remote ID*.



If the Remote ID system experiences an error due to insufficient GPS coverage on the drone or the remote controller, or a hardware malfunction, the drone prevents arming.



The drone continuously monitors the Remote ID functionality **from takeoff to shutdown** and provides a **notification of any malfunction or failure** in the top bar of the ABZ Control application. If the Remote ID system detects an error during flight, the RID icon will turn red, and the drone will provide an error message stating that the Open Drone ID has encountered a problem (e.g., not receiving a location message).

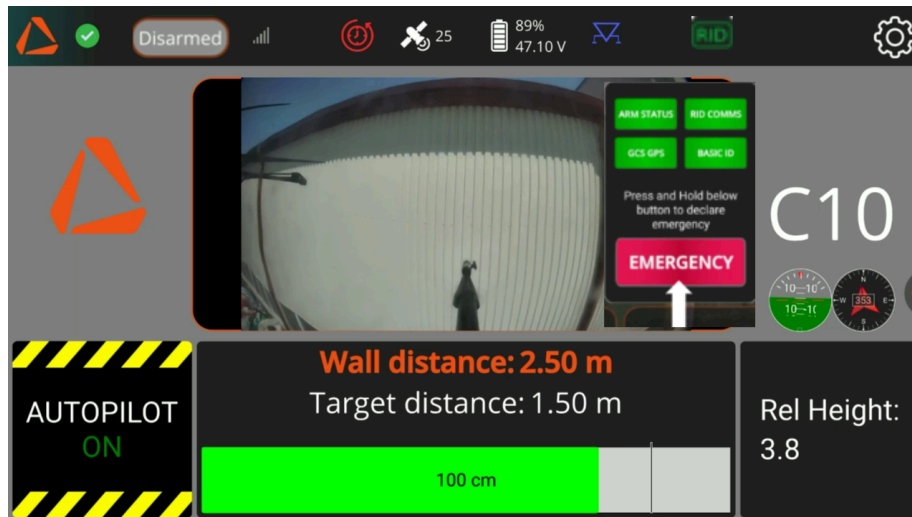
If the Remote ID system experiences an error during operation, the unmanned aircraft is no longer broadcasting the message elements of the standard Remote ID. ³The pilot must ⁴ land the unmanned aircraft as soon as practicable.

³ In the United States, the pilot must, in accordance with 14 CFR Part 89 (Minimum Performance Requirements for Standard Remote Identification of Unmanned Aircraft), land the unmanned aircraft as soon as practicable.

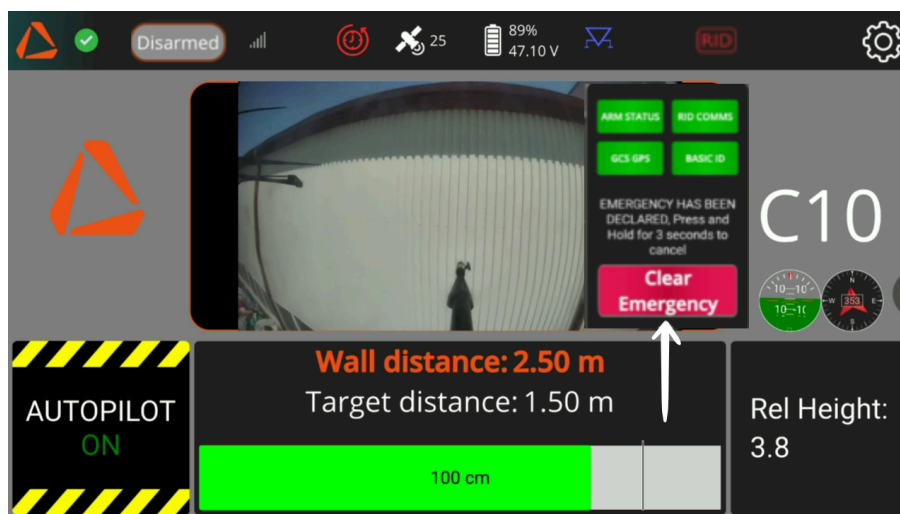
⁴ in accordance with 14 CFR Part 89 (Minimum Performance Requirements for Standard Remote Identification of Unmanned Aircraft: <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-89>)

Declaring an Emergency

In the Remote ID interface, the pilot can click on the **Declare Emergency** button. To declare an emergency, you need to **press and hold the button for 3 seconds**. This function may be employed in situations such as loss of control, potential threats to persons or property, or in other emergency scenarios, at the pilot's discretion.



When an emergency is declared, the drone will broadcast the emergency status. To clear the emergency, press and hold the same button (which now displays the text '**Clear Emergency**') for **3 seconds**.



Remote Controller

The C10 is compatible only with the controllers provided by ABZ Innovation with specialized ABZ Control software. Every firmware/software combination is compatible with the drone. The available remote controller unit:

- ABZ Innovation MK15

Other devices or applications are not compatible for controlling the drone, therefore prohibited to use with the drone.

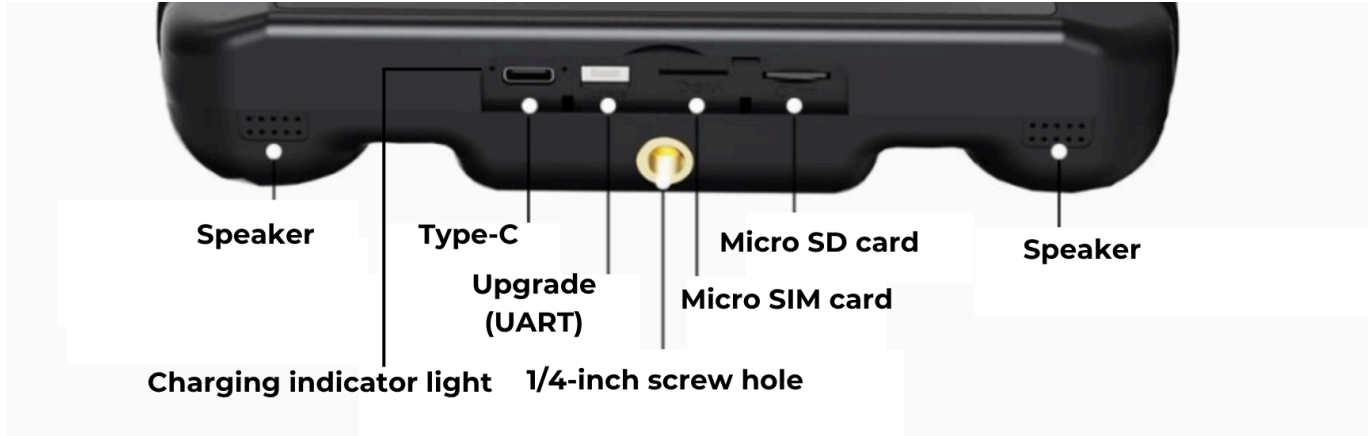
The MK15 remote controller is an Android operation system-based device, with an integrated system for communicating through radio signals with the drone. It runs the ABZ Control application to control the drone and let the pilot access all telemetry data and advanced flight planning.

If the remote controller is turned off, you can check the battery charge of the remote controller by a short push of the power button. The blue LEDs indicate the charge level. The single LED in front of them gives feedback about the connection between the drone and the remote controller. When the LED is green, the drone and the remote controller are connected.

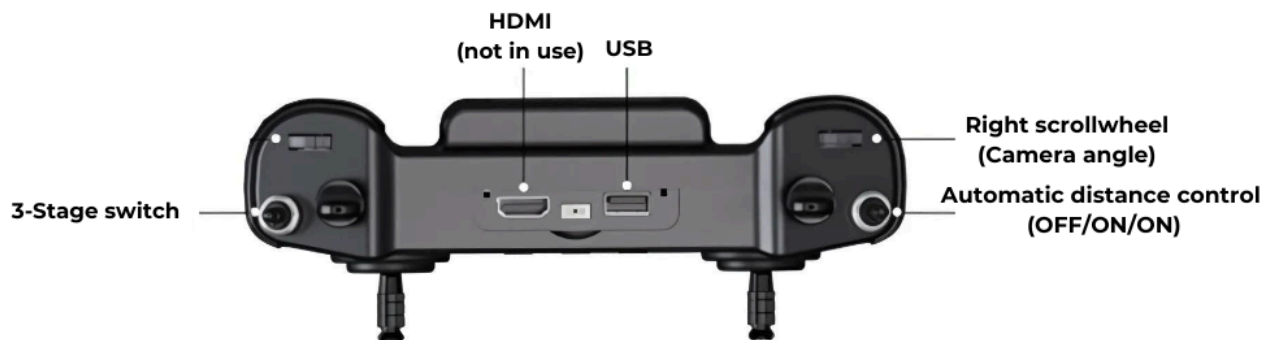


To switch on the remote controller, push the power button once briefly and then once more for a longer duration (until you hear the system's sound signal).

You can only charge the remote controller when it is powered off and only with the supplied fast Charger. The RC cannot be charged while working.



1. Connect the remote controller to the fast charger and plug it into the power supply.
2. The charging indicator lights are red when the ground unit is charging.
3. The charging indicator lights are green when charging is finished.

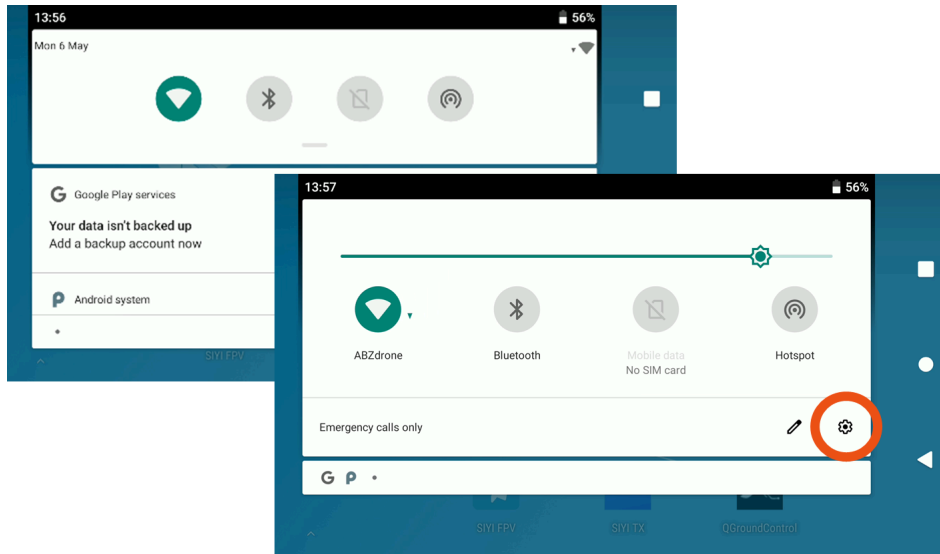


If you push the power button once short, the screen will turn off (power saving mode). If you push the button for 1 second, you can choose between the options of powering off the remote controller or taking a screenshot.

You can access the Android navigation bar by swiping down from the top of the screen or swiping from the right side of the screen.

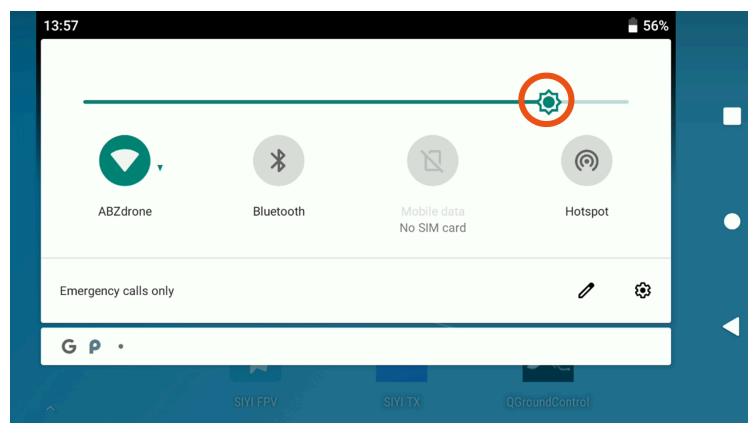
The rectangular icon allows you to switch between applications. The circular icon takes you to the main screen. The triangular icon lets you go back to the previous screen (note: this function is not supported in ABZ Control).

The remote controller battery status is displayed in the Android menu (by swiping down from the top of the screen).

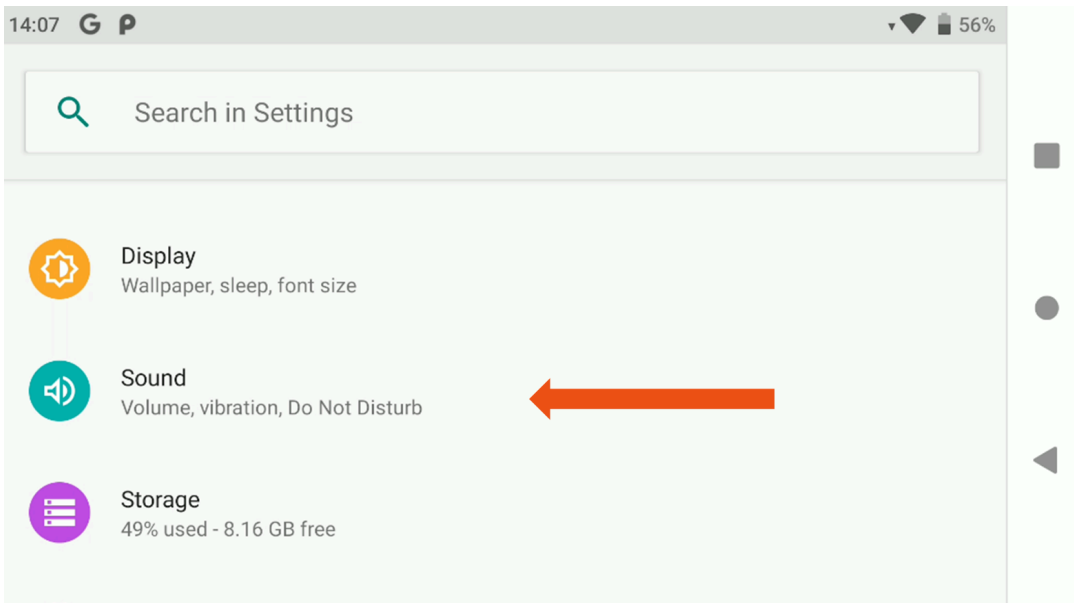


Set the **display brightness** and **sound volume** always according to environmental conditions (light conditions and noise level)! Setting the display brightness and sound volume is always accessible (even when operating the ABZ Control software) from the basic Android menu, swiping down from the top of the touch screen once, where the general Android quick menu appears.

Swiping down from the top of the touch screen once more, the slider for the display brightness setting appears:



Click on **Settings (gear icon)** then scroll down to the **Sound** menu and tap on it to show the sliders for volume control functions.

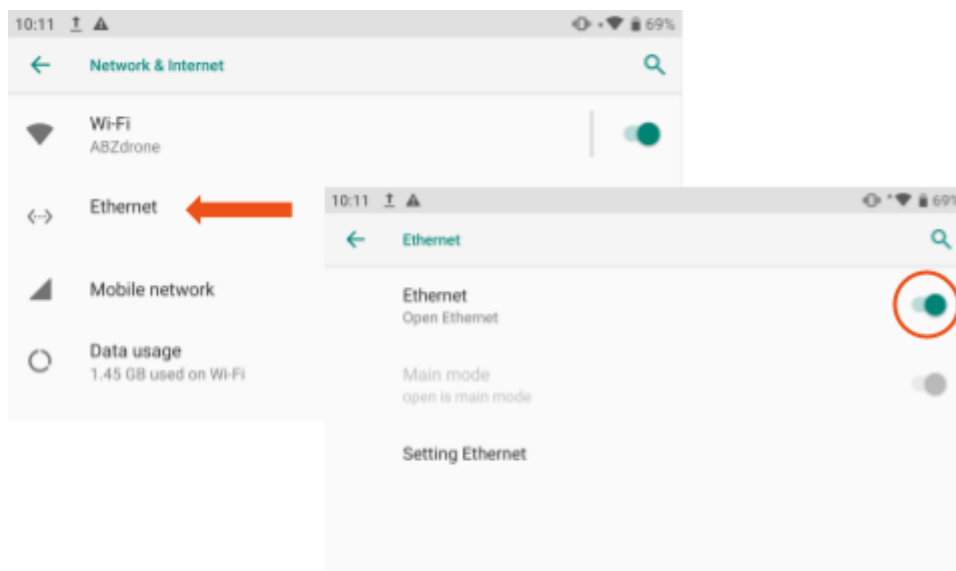


Media volume controls the ABZ Control application's alerts and information volumes. We highly recommend this always be set to the maximum volume.



Network settings

To ensure the proper functioning of the ABZ Control application, the Ethernet connection must always be turned on. This setting is available under *Android Settings > Network & Internet*.



Internet connection

The remote controller can access the internet via Wi-Fi or Bluetooth connection, e.g. shared from a router, mobile phone, tablet, or laptop.

These options are available in the Android's Settings menu (by swiping down from top), by long pressing the Wi-Fi or Bluetooth icon, or by tapping the gear icon.

In the submenu, the function can be switched on/off and the available devices can be connected. Wi-Fi only works on 2.4GHz networks. If the controller does not recognize the Wi-Fi from your mobile device, using Bluetooth connection for internet access is recommended.

To set up the Bluetooth connection for internet access:

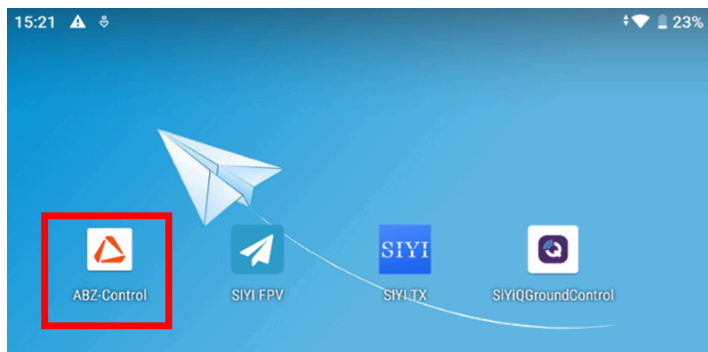
1. Turn off Wi-Fi on the controller.
2. Turn on Bluetooth hotspot / internet sharing on your mobile device.
3. Turn on Bluetooth on the controller and pair the two devices.
4. If your device is connected to the controller, you need to set up the internet connection.
5. Tap on the gear icon next to the device name, then turn on the Internet access.

ABZ Control Software Overview

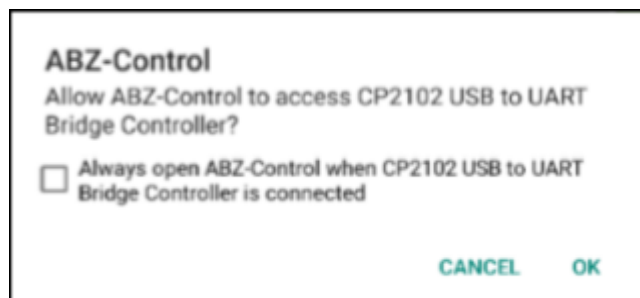
The C10 is compatible only with the controllers provided by ABZ Innovation with specialized ABZ Control software. Other devices or applications are not compatible for controlling the drone and, therefore, are prohibited from use with the drone.

No software update is needed before and during operating the drone; future updates are only optional. Any future software updates will not affect the control and flight functions. Software update procedures are explained and guided in the documentation of the update package. All information and files are available at: abzinnovation.com/updates. Please check this website if you are looking for software or firmware update options.

Start the ABZ Control flight control and planning application by clicking on its icon on the home screen.



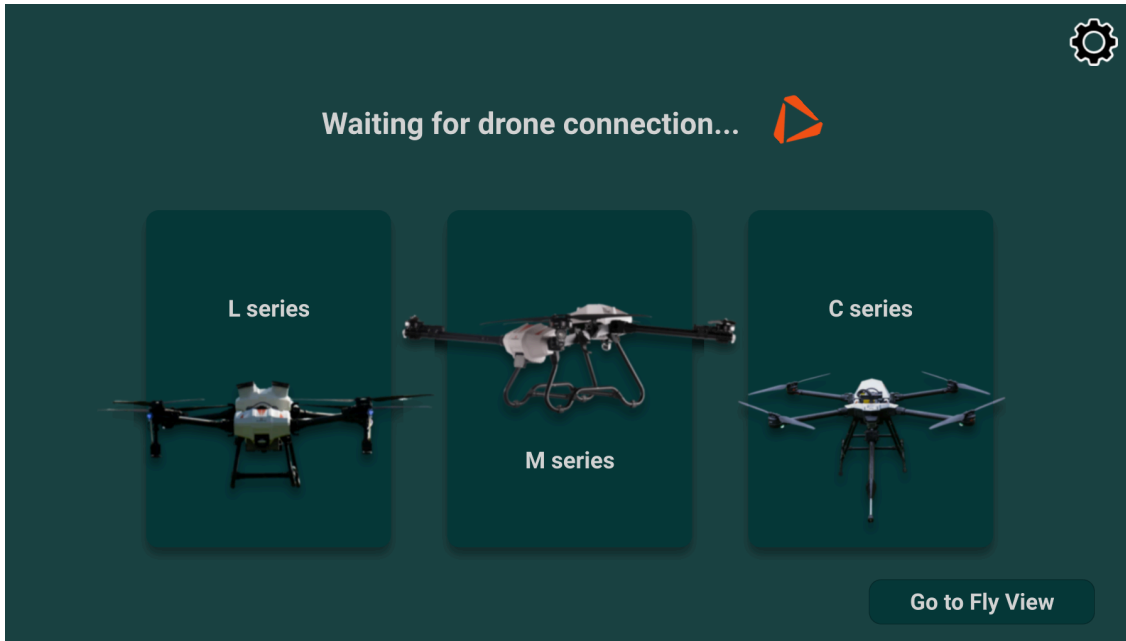
After starting the ABZ Control application, you will receive a pop-up window with the message: Allow ABZ Control to access USB to UART Controller. Click on OK.



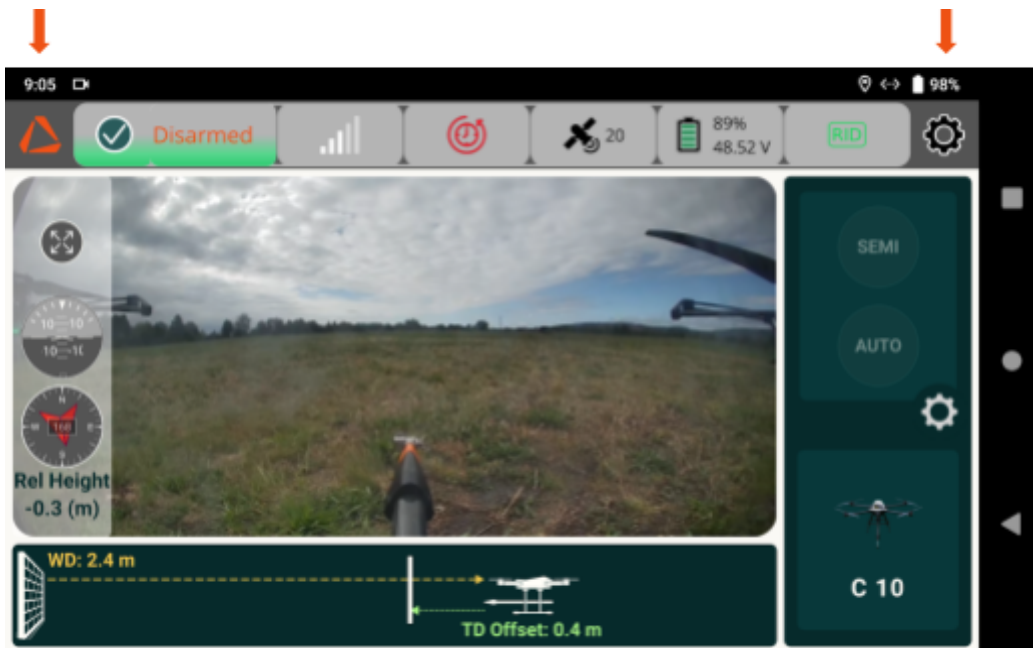
ABZ Control

ABZ Innovation C10

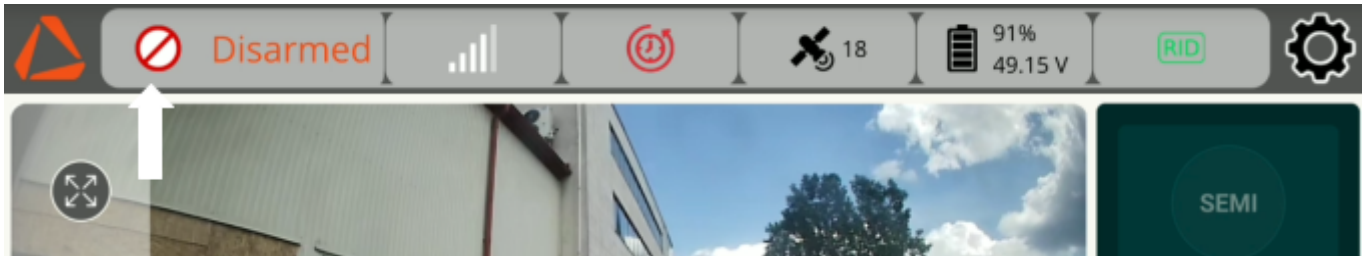
While the drone connects to ABZ Control, the startup screen is displayed. You can access **Settings** without connecting to the drone by clicking the **Gear icon**. To open the Fly view without a drone connection, click the **Go to Fly View** option.



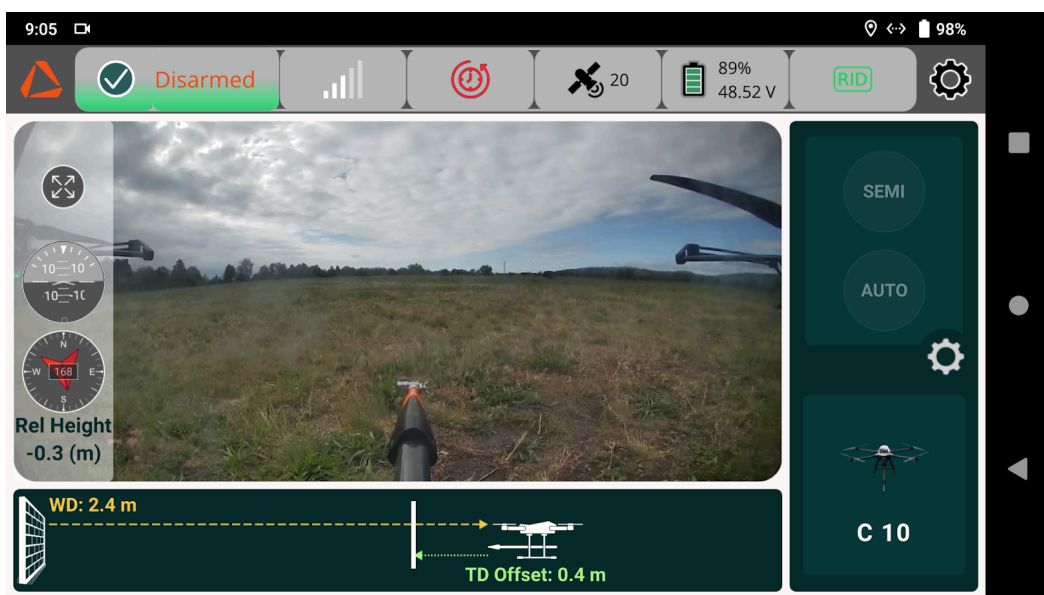
After launching the application, the following screen will be displayed: In the top menu bar, you will see the **Fly view** and the **Settings** icons.



After turning on and connecting the drone, you will find additional status icons at the top: vehicle messages, GPS status, Drone Battery status, and Remote ID status. On the left side of the top bar, a red no-entry sign indicates that the drone is still preparing its systems for the flight.

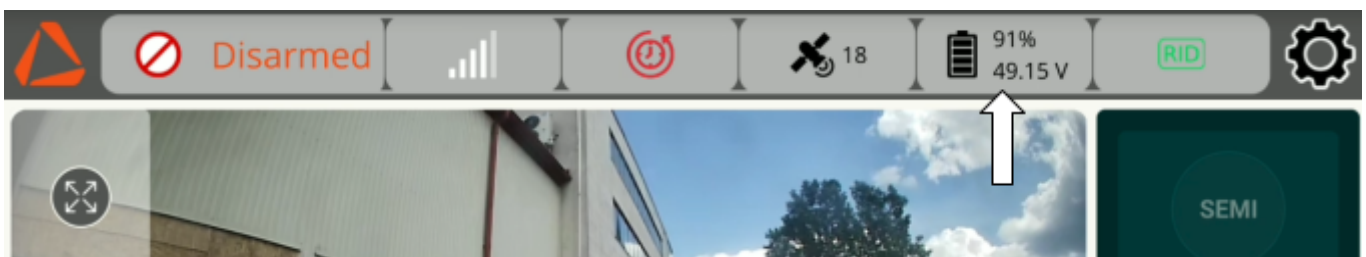


If the icon changes to a green check mark, the drone is ready and can be armed.



The drone battery icon serves only as an indicator and shows an approximate value. During the flight, the pilot must monitor the battery voltage, which should always be above 43.5 V, even when flying with the Maximum Take-off Mass (MTOM). When the battery voltage level drops under 43.5 V, start returning and landing the drone.

The state of the drone battery should also be monitored before the flight using the charging indicator LEDs on the battery. We recommend starting the flight with a minimum of 80% battery charge.



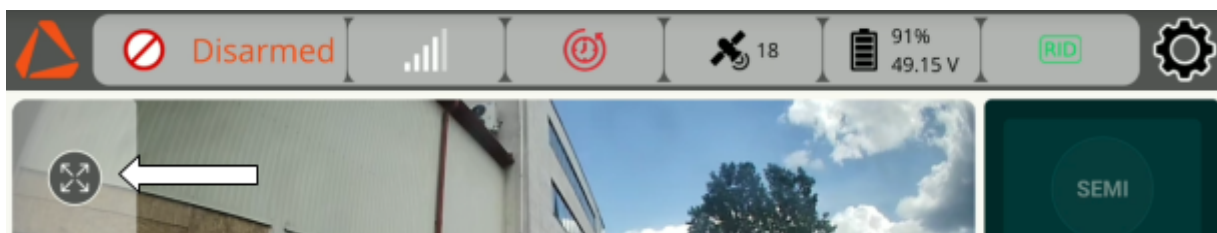
The drone's real-time altitude, measured by either the barometer or GNSS sensors, is displayed in the Values Display on the left side of the screen. For more information regarding the [altitude control methods](#), see page 43.

In the bottom-left corner of the screen, the current status of the Auto-Pilot System is displayed in the Auto-Pilot Panel. If the Auto-Pilot is active, the icon of the drone turns orange, and the corresponding mode button turns green.

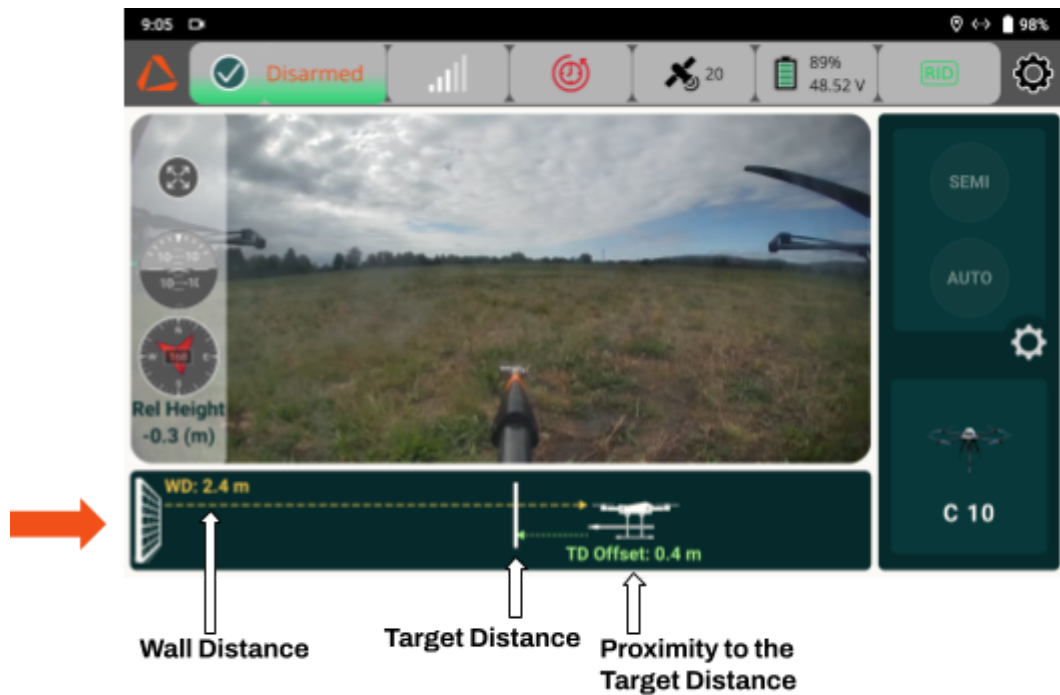


For more information about the [Automatic Distance Control System](#), see page 47.

To support the pilot, the live camera view is shown in the center of the screen for better visibility during operation. To enlarge the camera image, click the maximize icon in the Value Display.



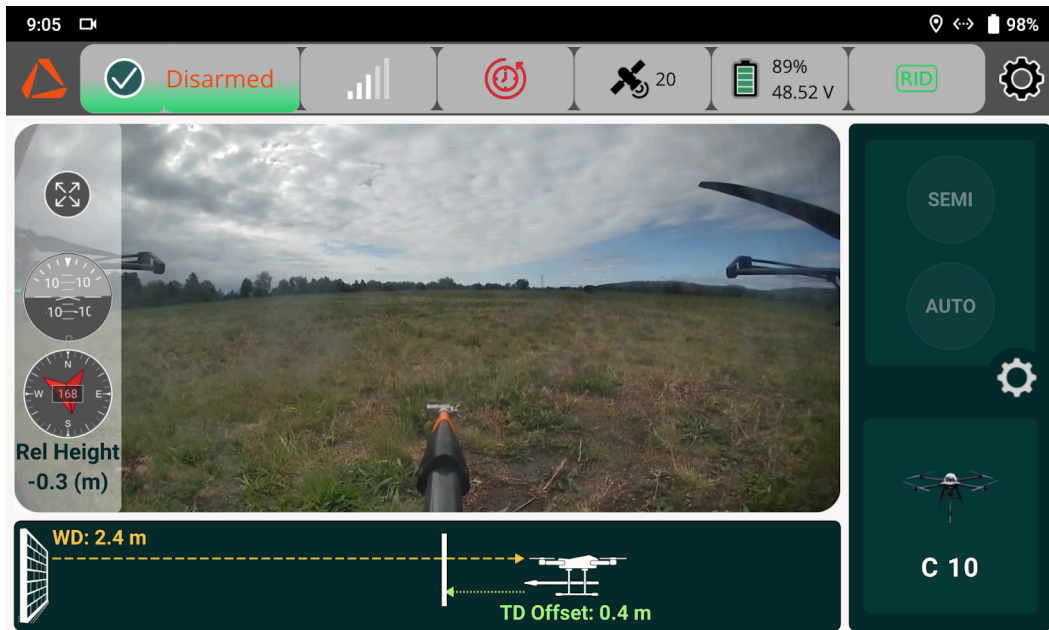
The distance from the wall can be monitored during flight using the Distance display bar at the bottom of the screen.



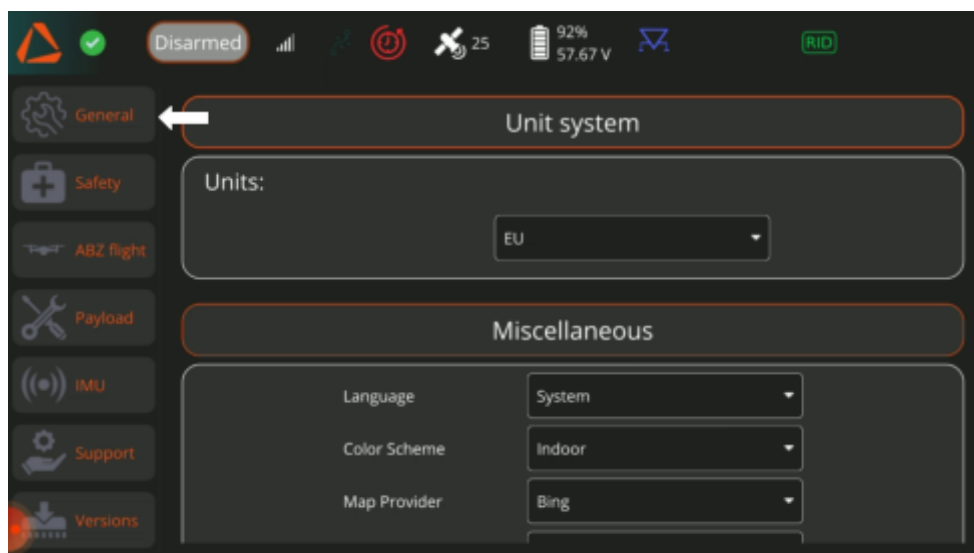
- The right edge of the Distance Display bar represents the wall surface.
- The strip between the wall end and the drone indicates the **Target Distance**.
- The drone and **TD offset** indicate the drone's current position and its difference from the target distance.
- The value displayed as **WD (Wall Distance)** shows the drone's current distance from the wall.
- The Wall Distance color changes to indicate the drone's proximity to the desired distance:
 - **Red:** The drone has exceeded the target distance.
 - **Yellow:** The drone is getting closer to the Target Distance.
 - **Green:** The drone is within ± 0.2 meter (8 in) of the Target distance.

Settings

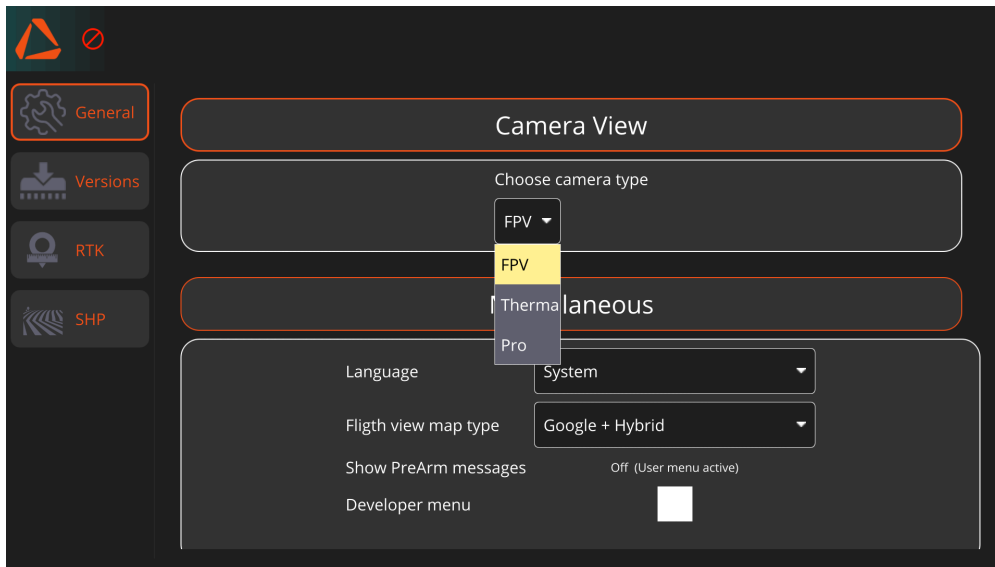
In the Settings menu, you can adjust user interface options (such as language or units of measurement), configure the drone geocage, and configure the Remote ID system. To access **Settings**, tap the gear icon in the top-right corner of the screen.



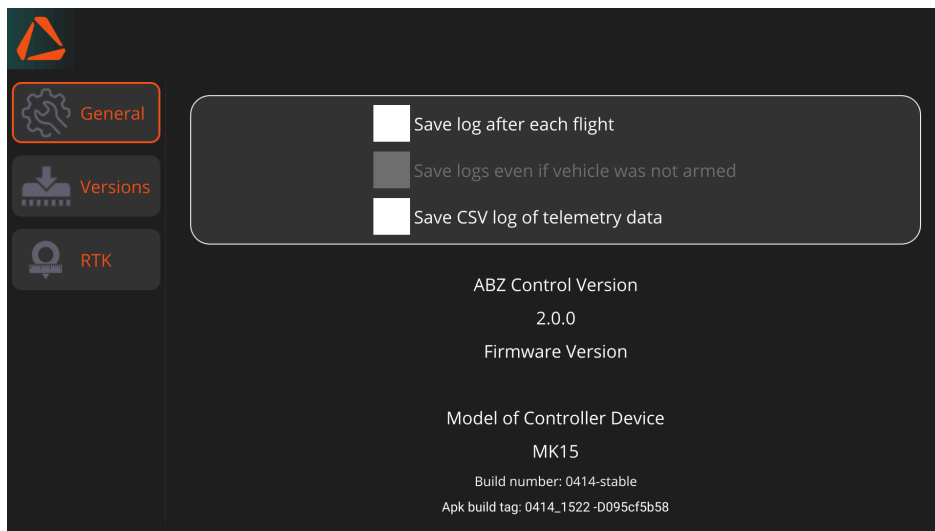
In the **General** menu, you can configure various settings, including the default units used for measurements in the ABZ Control interface



Under the **Camera View** section, you can view the camera type used by ABZ Control. The default setting is FPV.



The current software version of your drone is displayed at the bottom of this page. If you contact our Support Center with an inquiry regarding your drone, you will be required to provide this information. The same details are also accessible via the *Settings > Versions* menu.

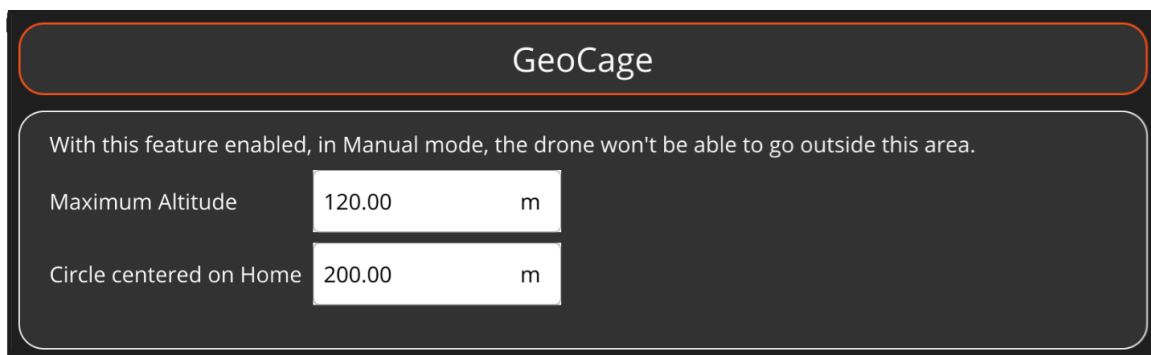


Safety – Setting up FailSafe

When using a UAS, unexpected events may occur that require intervention. The FailSafe settings are required by law, primarily to prevent personal injury and property damage.

In the case of a tethered drone, most safety settings are predetermined by law and cannot be modified. These requirements have been implemented in the C10 system. Under *Settings > Safety*, you can configure the Geofence functions: you can set virtual boundaries that the drone will not fly beyond.

- Under the **Maximum Altitude** option, you can set the maximum altitude the drone should fly. The drone will not fly above the specified altitude relative to the takeoff position. The value can be set up to 120 meters (131.2 yards). In accordance with legal regulations, the **C10** drone is designed never to exceed a height of **120 meters (131.2 yards)**.
- Under **Circle Centered on Home**, you can specify a circular **GeoCage**, which defines the maximum distance the drone should fly from the takeoff position. The drone will stop if it reaches the specified radius.

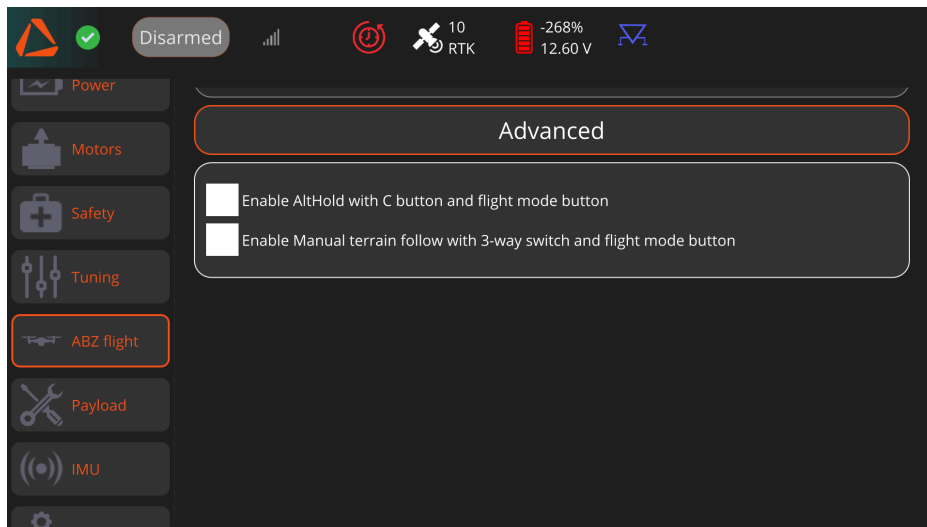


For more safety instructions [when you use the Geocage with AltHold](#) flight mode, see page 60.

Abz Flight

In the ABZ Flight, under the **Advanced** section, you can enable flight mode settings that are initially disabled on the Remote Controller:

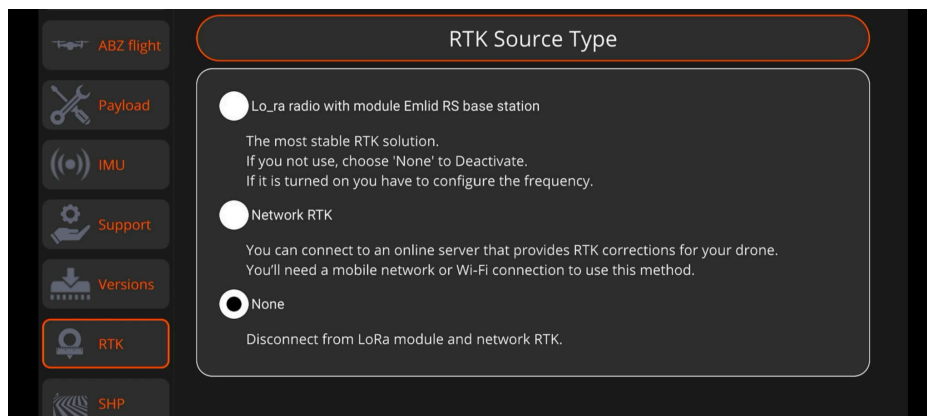
- **AltHold Mode:** Allows you to assign Alt Hold to the **C button** and the **virtual Flight Mode function button** (in ABZ Control).
- (Please disregard the option for turning on the altitude control method switch (3-stage switch), as it is not applicable to your drone type.)



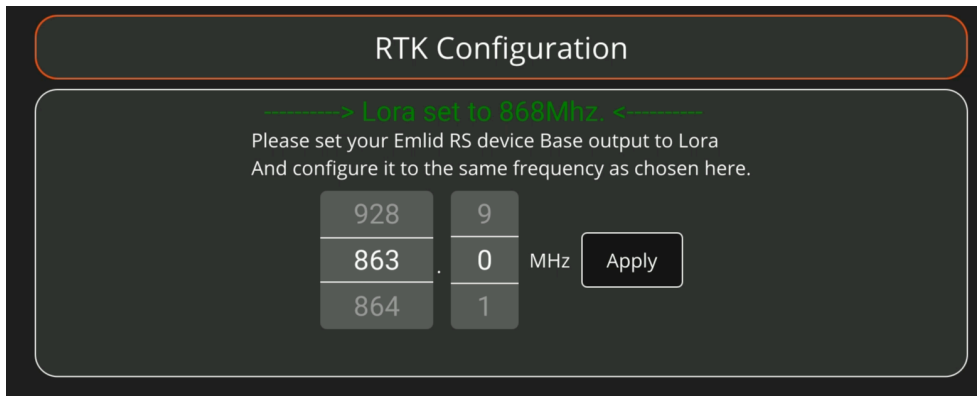
RTK configuration

In the RTK menu, you can connect to an RTK correction data source to achieve centimeter-level positioning accuracy during flight. You can connect either to:

- an online server server that provides RTK for your drone(Network RTK),
- an **Emlid base station via LoRa radio****, local **NTRIP**, or **NTRIP (via the Emlid Caster)**.



If using an **Emlid RS base** station with LoRa^{5**}, make sure it is configured to Output: LoRa, and that the frequency matches the Base output value specified in the **Emlid flow app**.

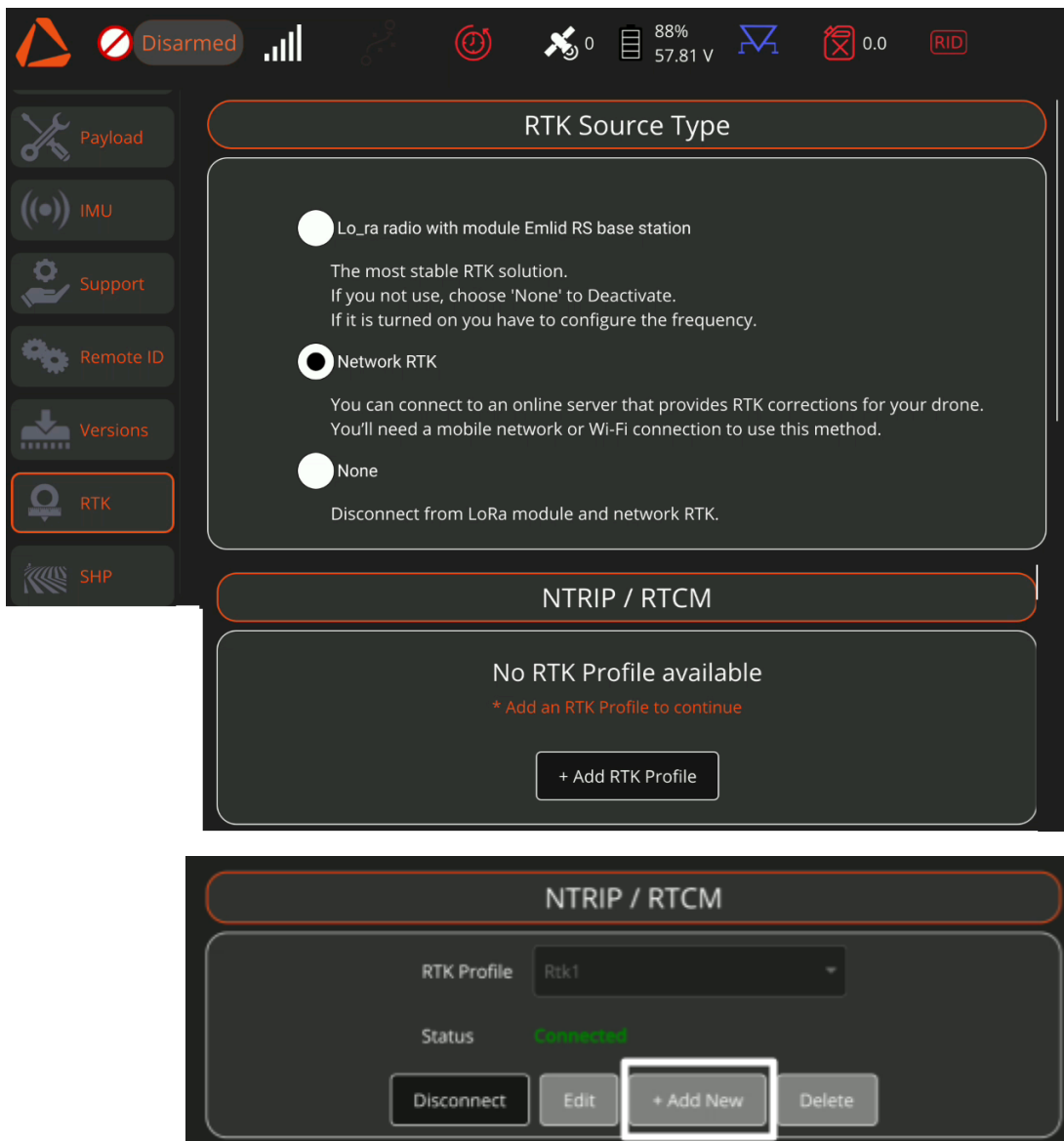


You can also connect to an Emlid RS base station via **local NTRIP** using the **Network RTK** option. For the required credentials, refer to the Emlid Flow app. For further information about the [Emlid RS](#), see page 67.

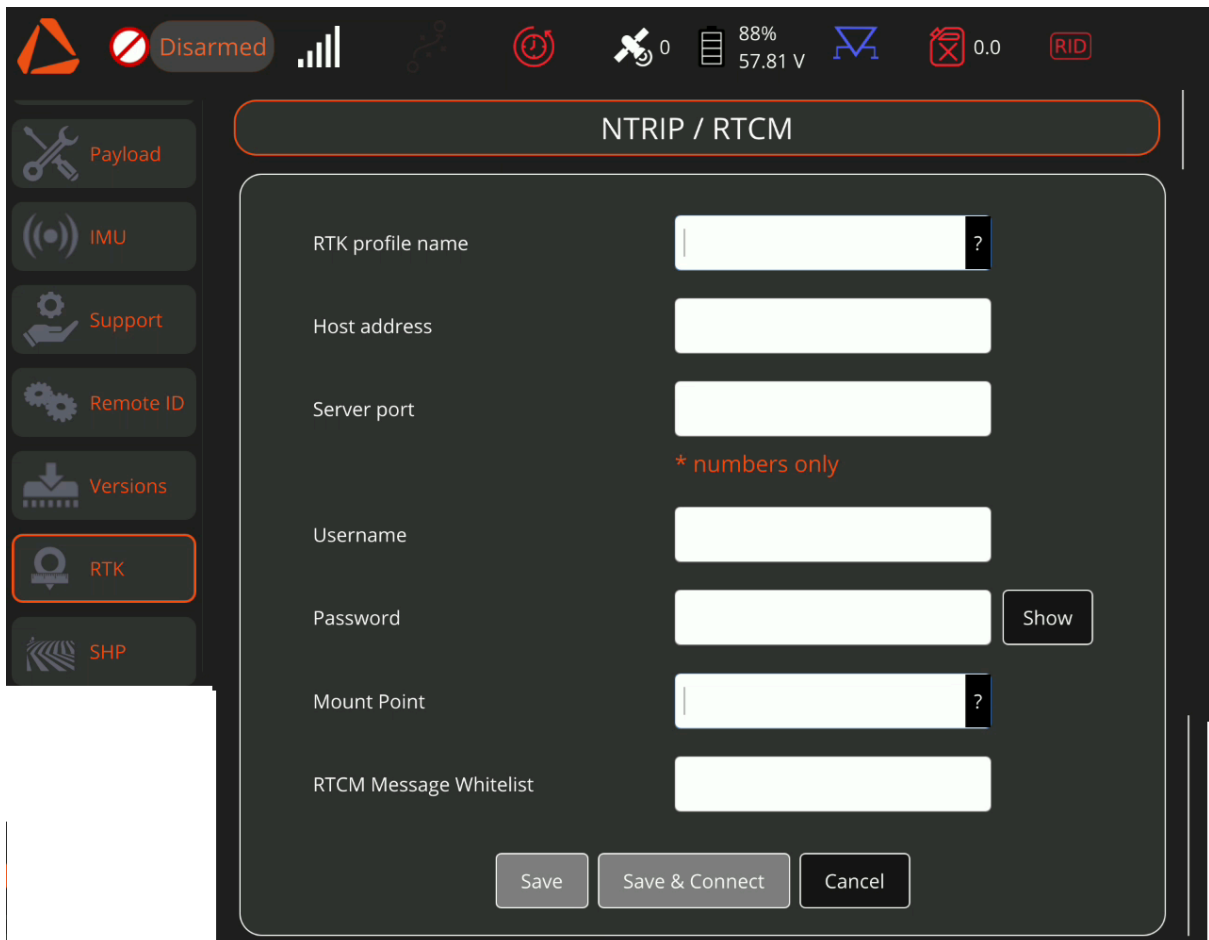
Under **Network RTK**, you can connect to a Network RTK environment, or to the nearest Continuously Operating Reference Station (CORS) through an NTRIP Caster. You can also connect to your Emlid base station through Local NTRIP or NTRIP. (For more information about connecting to the Emlid base station, [refer to page 67](#).)

To receive corrections from a Network RTK provider, connect to the internet with your mobile device as a hotspot.

^{5**}The LoRa connection to the Emlid base station is only applicable for serial numbers ending in numbers below 00238.

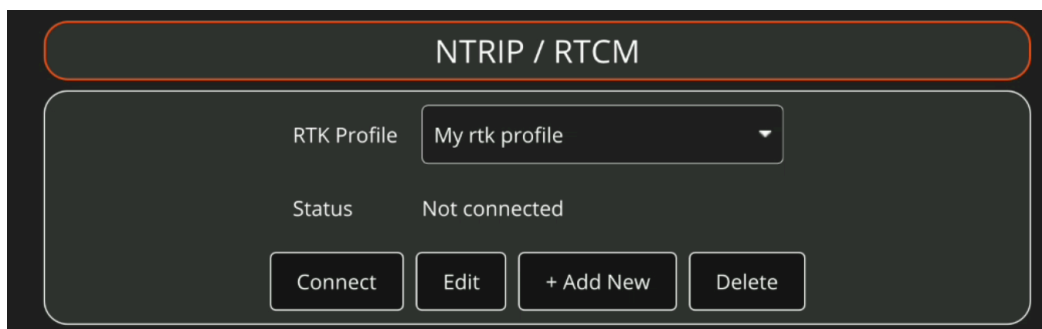


To receive corrections through NTRIP connection, make a profile by clicking **Add RTK Profile** or **Add new**. After you give a name to the profile, enter the credentials given by your NTRIP service provider. Click on **Save & Connect**.

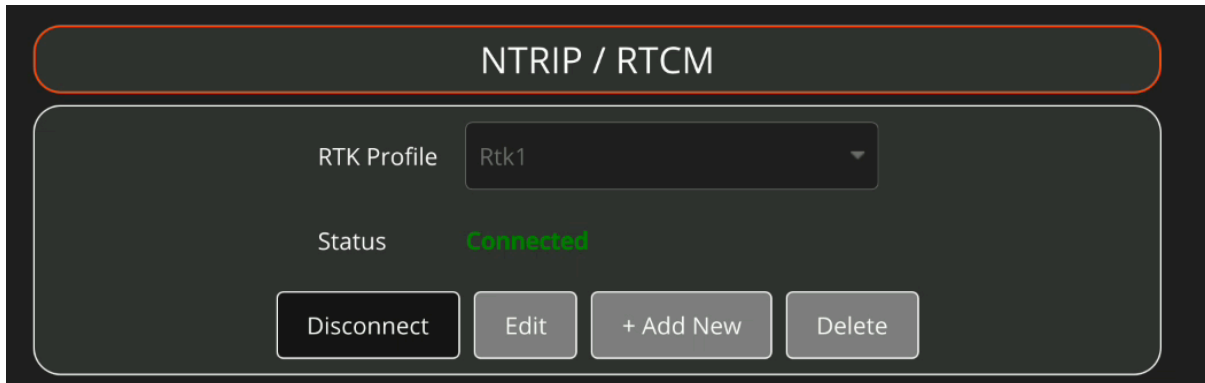


You can save multiple RTK profiles.

To connect to an RTK Profile, select it from the list and click Connect.

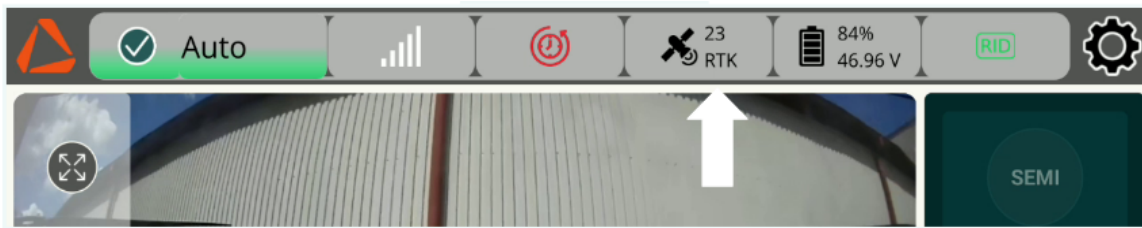


To edit the Credentials of an RTK Profile, click on **Edit**. To delete an RTK Profile, Click **Delete**.

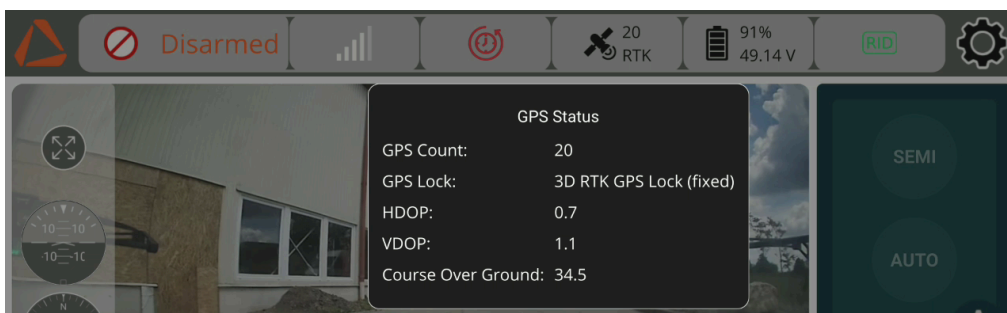


If you choose to fly with an RTK source, the system will only allow you to arm the drone if the correction data is accurate enough to ensure proper drone positioning.

If RTK correction is available and accurate, the “RTK” status will appear next to the GNSS icon in the top bar.



Do NOT fly near buildings without RTK Correction.



IMU - Compass calibration

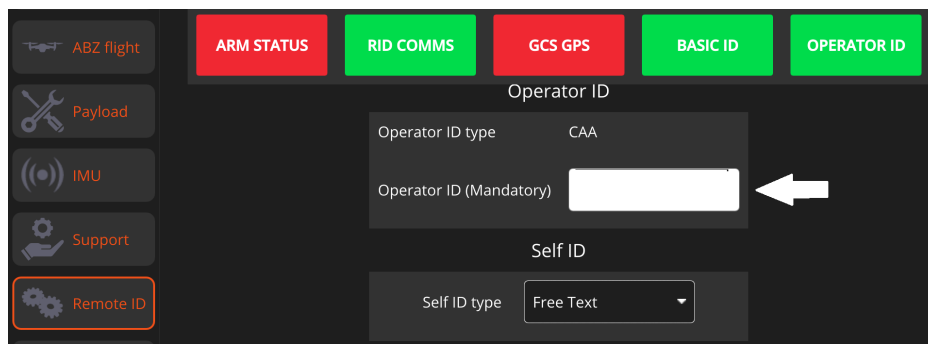
Under the **IMU** option, the **Compass Calibration** can be carried out. The calibration should only be performed if requested by the software or instructed by the Support Center.

For further instructions, see [Compass Calibration](#) (page 75).

Remote ID

In the **Remote ID** section, you can set the **SELF-ID** to transmit during operation. Use this function if you want to show your identification, the flight task, or both. This helps to make persons feel safe when the UA operates near them.

If you operate the drone in the European Union, you must register as a drone operator on the official website of your National Aviation Authority. After you register, you receive a registration ID number. Enter this number in the **Operator ID** field.



Software versions and Update

You can check the current drone firmware and ABZ Control software versions under **Settings > Versions**. If you contact our Support Center with an inquiry regarding your drone, you will be required to provide this information.



ABZ Innovation communicates all new software releases via email. Only perform updates when instructed to do so by ABZ Innovation.

Controlling the drone

It is only permitted to operate the drone in full compliance with this entire operator's manual and specifically the checklists.

Manual flight commands - switching flight modes to choose manual flight control:

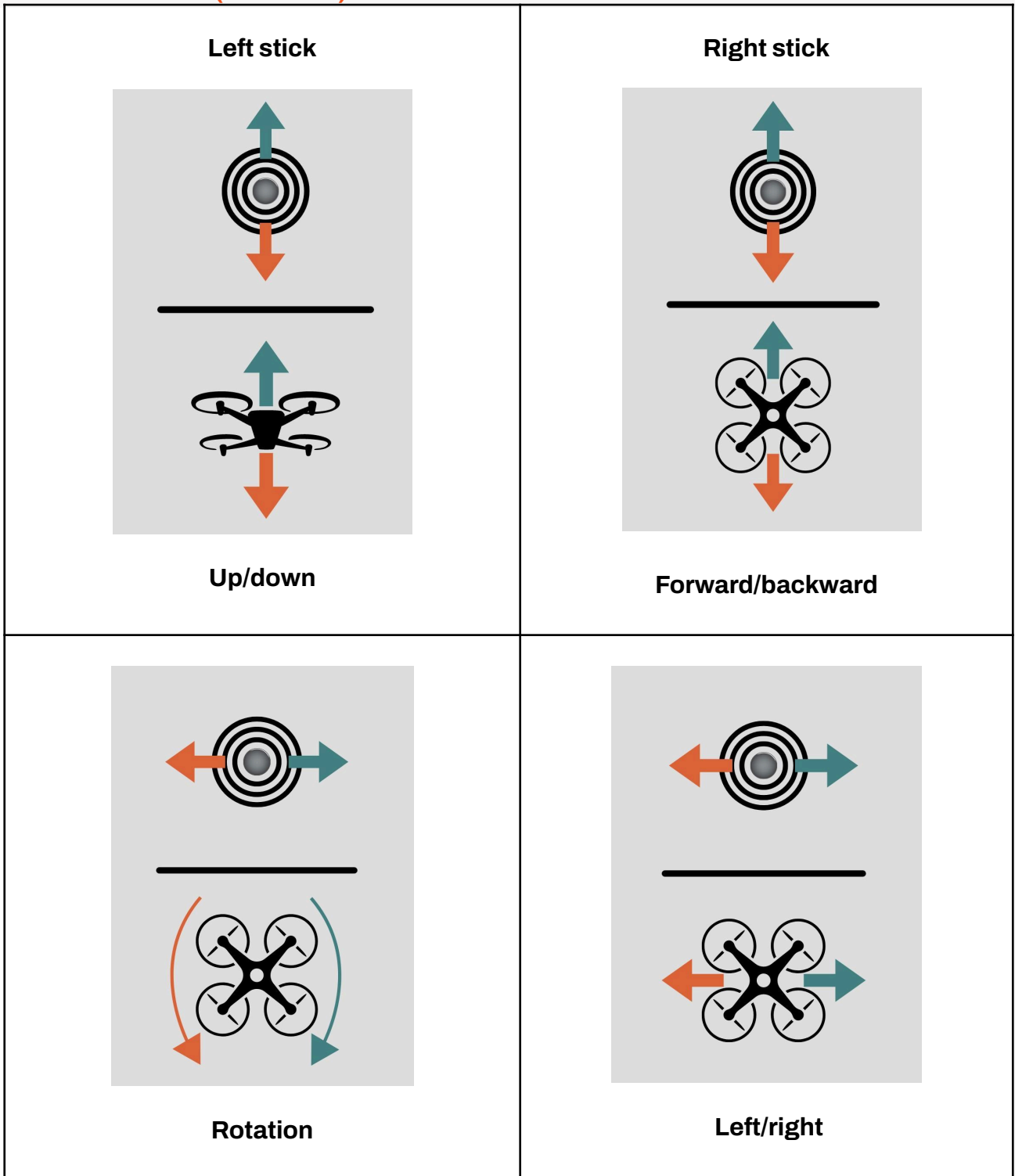
- **Manual (Loiter) flight mode: A button** – (GPS-based) the flight must be controlled manually with the sticks. If both sticks are fully released, the drone will stop and hover at the actual GPS coordinated position.

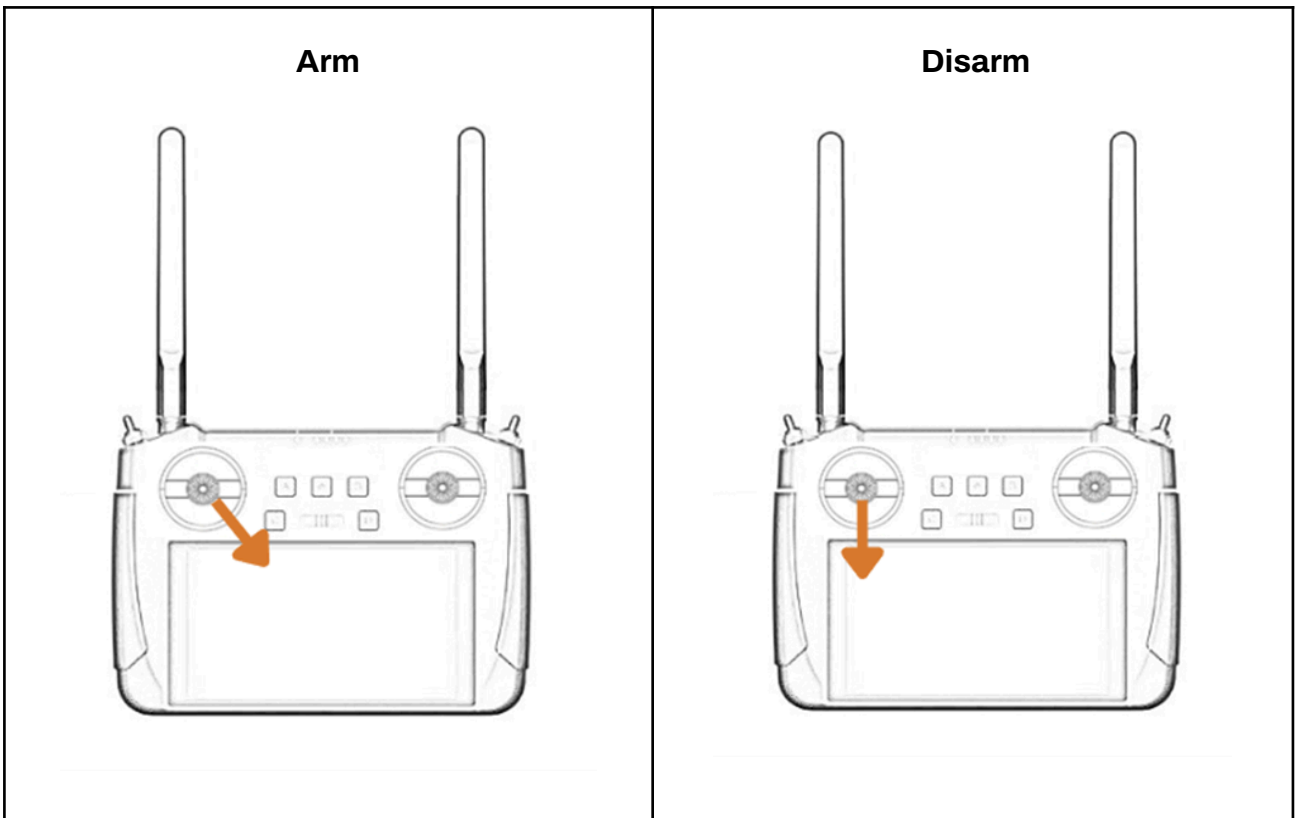
Alternatively, when flying in Auto mode, **pull the pitch stick (right stick) fully rearward** to switch to **Manual** mode.

- **AltHold flight mode (WITHOUT GPS positioning):** By default, this manual flight mode is **disabled** on the RC. To enable it, go to *ABZ Control > Settings > ABZ Flight > Advanced*. Once enabled, AltHold mode can be activated with the **C button**.

In this mode, flight, braking, and stopping must be controlled manually with the sticks. The drone does not maintain its position, and the pilot must counteract wind forces. The drone maintains altitude using only its barometric pressure sensor, so the pilot must pay attention to altitude changes caused by atmospheric and weather conditions.

Default control (mode 2)





Manual flight commands:

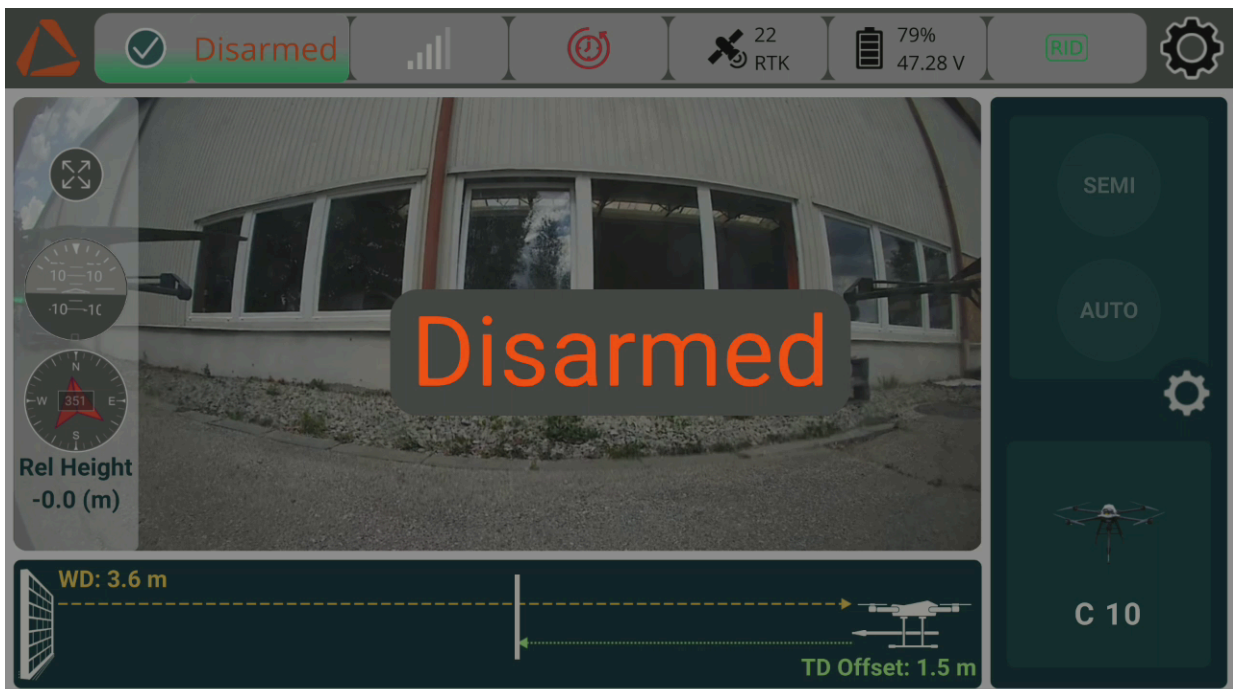
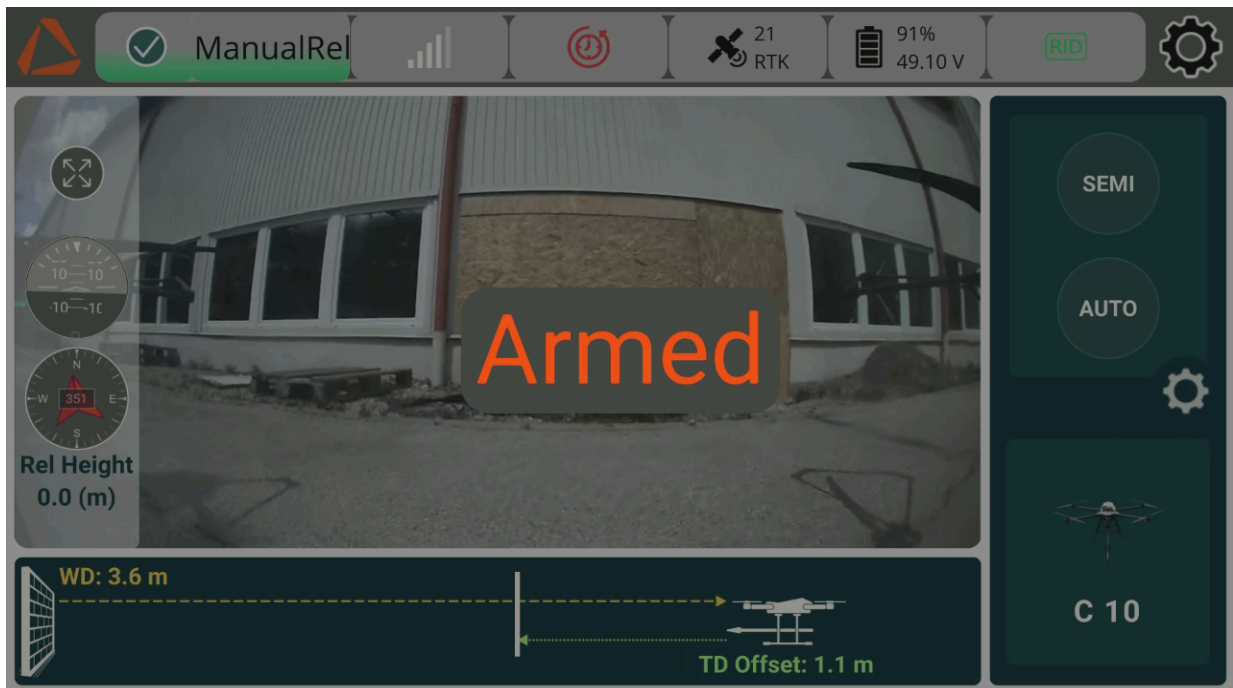
Emergency stop: In case of emergency, push the **C button** and **D button**. The motors will stop immediately, and the drone will crash into the ground.

The drone's pitch and roll angles, turning radius, climb, and descend speeds are limited by firmware in order to ensure safe flight. The pilot can safely fly the drone within all possible pilot inputs, no extra limitations are needed to implement manually.

- **Takeoff:** Switch to "Armed" mode by pushing the left control stick fully to the **down-right position** until "Armed" is shown on display, then release.
- After the motors are started, fly the drone manually by controlling it with the left and right sticks in Mode 2 by default and take off to a safe height (at least 2m / 6.6 ft).
- **Land: Manually** control the descent speed and **slow it down** before reaching ground.
- After landing, switch to „**Disarmed**” mode by pushing the **left control** stick fully to the down position until „Disarmed” is shown on the display and the motors are completely stopped, then release.

Make sure to release the stick immediately after arming or disarming, once the RC notifies you of the status change. Otherwise, the system may interpret your action as accidental and revert to the previously selected mode.

When you arm or disarm the drone, a large orange text appears on the screen, notifying you of the drone's status change:



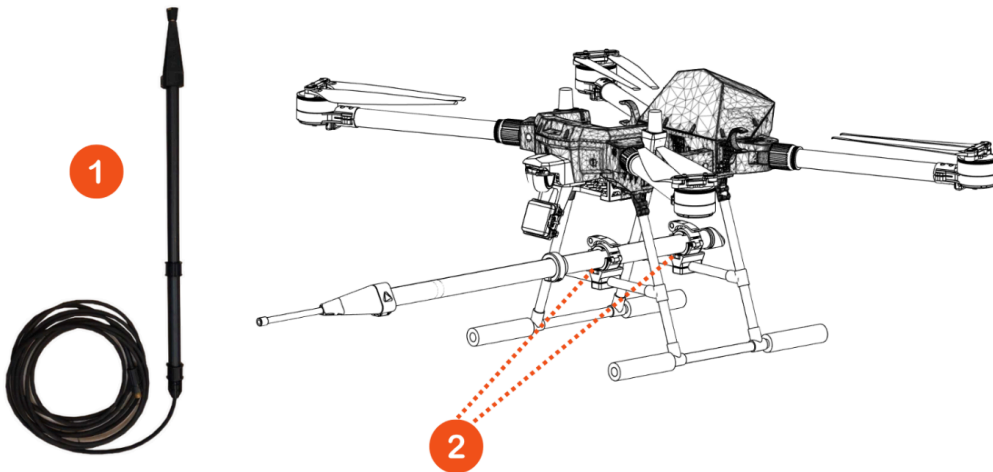
Altitude control

By default, Relative Altitude Hold mode uses barometric measurements as the primary height source. The drone's altitude is maintained relative to the takeoff point. The pilot must be aware of altitude variations caused by atmospheric and weather changes.

If you are flying with an **Emlid base station or Network RTK using correction data**, the drone relies on GPS information as Primary Height source.

Cleaning System installation

Please follow this manual to safely and correctly install and remove the lance on your ABZ Innovation C10 cleaning drone.

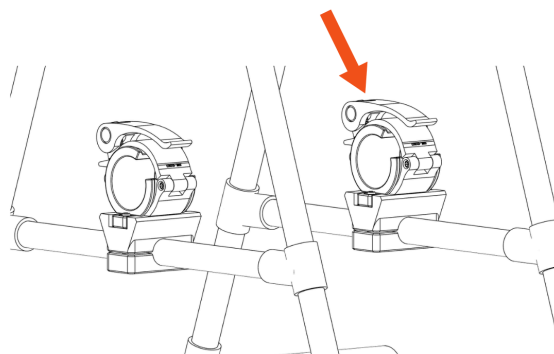


1. Cleaning lance

2. Mounting clamps

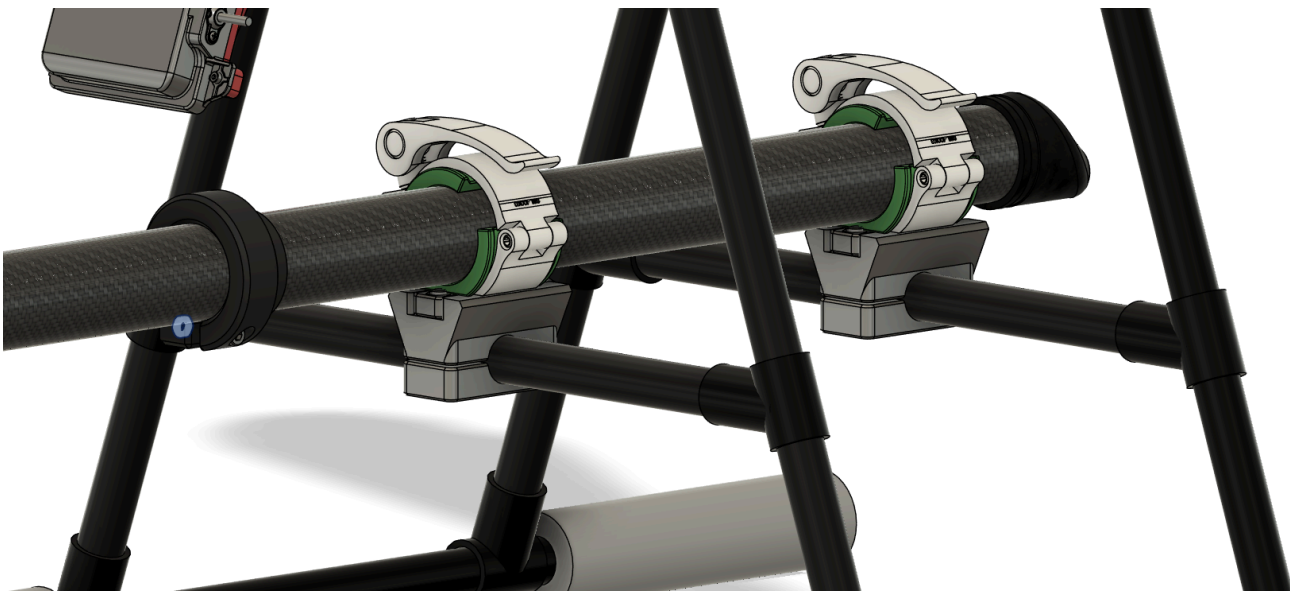
Assembly Instructions

1. Open the mounting clamp using the quick-release lever to prepare the drone for assembly.



2. Carefully insert the lance into the mounting clamp, starting from the rear.
3. Close the rear mounting clamp using the quick-release lever, but do not tighten it fully. Leave it slightly loose to allow for manual adjustment of the lance if necessary.

You can adjust the tightness of the mounting clamp by turning the open quick-release lever.



IMPORTANT: Adjust the lance position only within the range defined by the front ring and the rear bracket. **Improper use will result in the drone becoming uncontrollable!**

Using the tilting nozzle holder in the extended position is prohibited. If using the tilting nozzle holder, ensure that the limiter ring on the lance touches the outer side of the front quick-release clamp.

When you use the tilting nozzle holder, make sure that the water jet exits parallel to the longitudinal axis of the drone. A non-parallel water jet can generate a lateral force and overload a motor.

5. Secure the Mounting clamps firmly.

Lance Removal

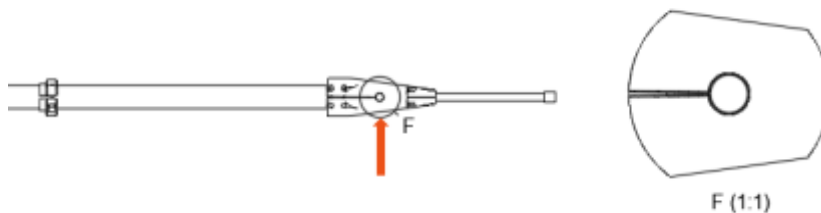
1. Unlock both quick-release levers to prepare for the removal process.
2. Carefully remove the lance from the clamps.

Changing the nozzle holder

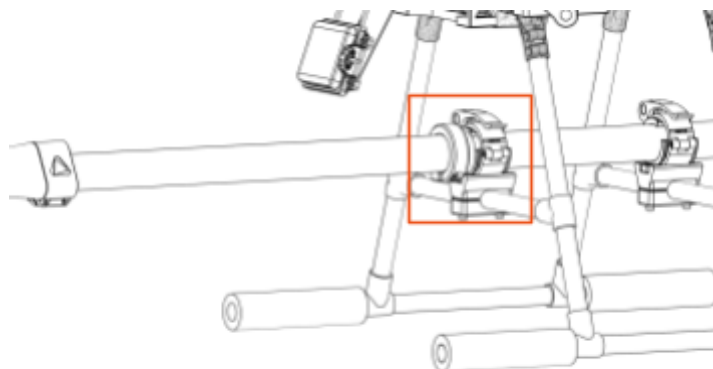
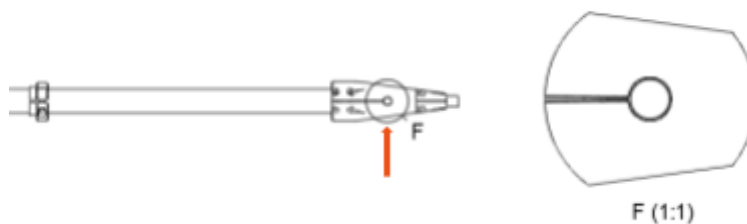
Your C10 drone comes with two types of nozzle holders (straight and tilting). Before changing them, ensure that the screw on the downward-facing side of the plastic housing is properly tightened to 3.2 Nm using a 5mm hex head tool. When securing the nozzle holder, do not apply excessive force—tighten it by hand only.

Adjusting the metal extension tube

If you are using the C10 with the standard nozzle holder and require it for your operation, you can adjust the length of the metal extension tube enclosed in the lance to extend below the lances head. To do so, loosen the screw on the downward-facing side of the plastic housing.



IMPORTANT: Using the tilting nozzle holder is prohibited in extended position. Please use the tilting nozzle only in fully retracted position of the metal extension tube! Also please make sure that the limiter ring on the lance touches the outer side of the front quick release clamp.



Hose installation

To install the hose to the washing lance, insert and screw the threaded metal connector of the hose into the red swivel connector. Hand-tighten securely.



Automatic Distance Control System (Radar-Based)

The **C10 drone is equipped with an automatic distance control system** that uses radar technology to support safe and efficient washing operations.

The radar:

The front-mounted radar on the drone measures the distance to the surface being cleaned.

Note that this measurement is taken from the radar's position—not from the tip of the lance.

The Radar, mounted on the front of the drone, can determine the distance to the surface with an accuracy of 2-6cm (0.8–2.4 in), from 0.5m to 50m (1.6–164 ft.). It has a horizontal viewing angle of 43° and a vertical viewing angle of 30°.

Modes of Operation

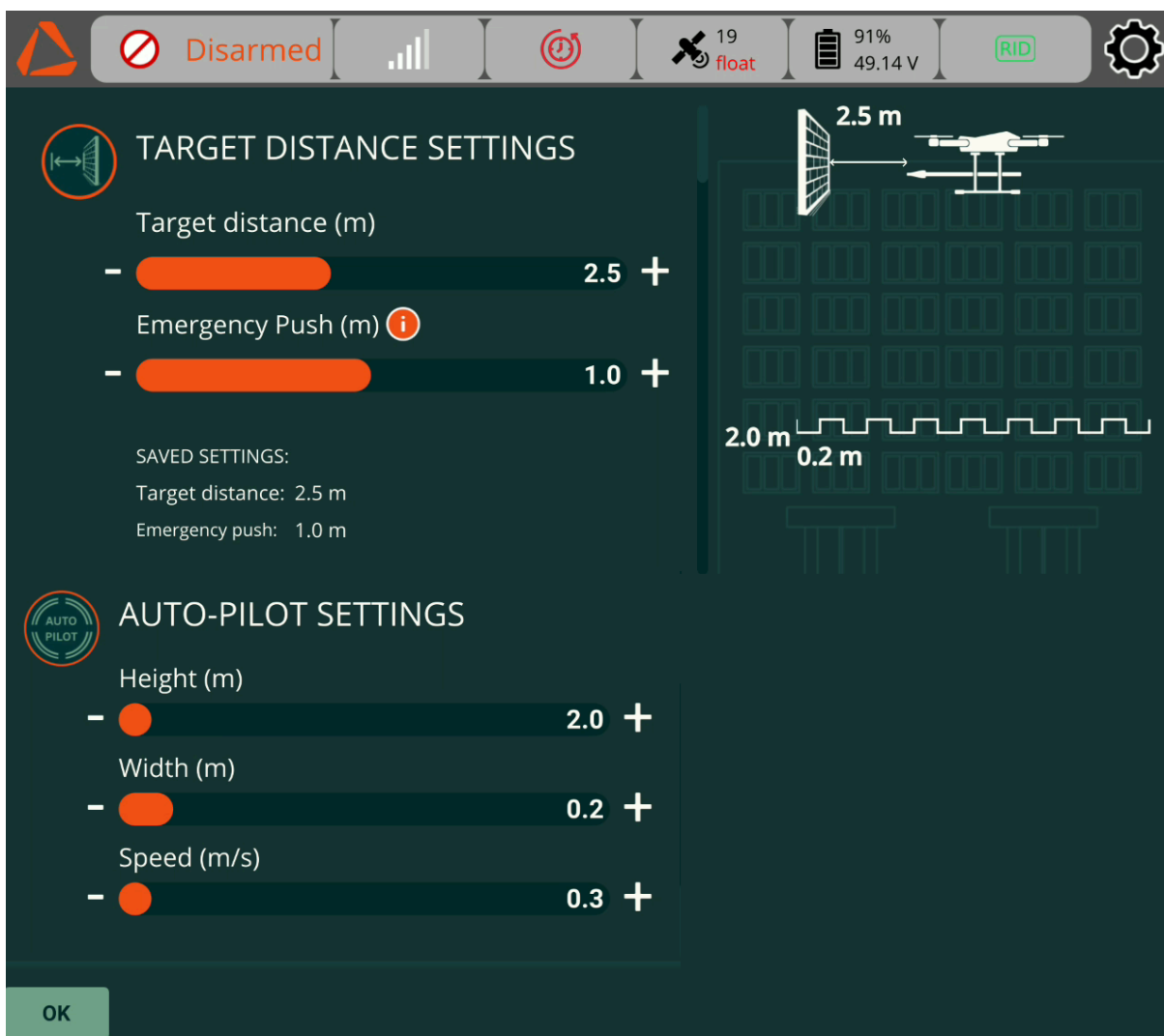
When performing cleaning tasks, the pilot can choose between two primary levels of automation:

- **Semi Automatic Distance Control System:** The system handles the proximity to the wall, maintaining the pre-set target distance. In semi auto mode, the pilot **retains control over the drone's vertical and lateral movement** using the remote controller sticks. The system helps maintain a consistent working distance and prevents dangerous proximity. This mode is ideal for "spot cleaning" or addressing irregular stains.
- **Vertical Auto Mode:** The **Vertical Auto Mode** is a flight planning mode to clean large, uniform wall surfaces. This mode automatically controls the vertical and horizontal movement of the drone. The drone automatically moves in an L-pattern across the wall surface. First, it moves vertically (up or down). Then, it moves horizontally (left or right). We recommend that you use this mode for surfaces with a minimum height of 10m / 33ft.

Important:

**The auto-pilot system is not a substitute for manual control.
The pilot remains fully responsible for safe and accurate operation at all times.**

The **autopilot parameters** must be configured in the Auto-Pilot Panel **Settings** menu before initiating an automated mission. The settings cannot be changed during Auto Flight. The settings can be changed in Manual Flight mode.



Auto-Pilot Settings

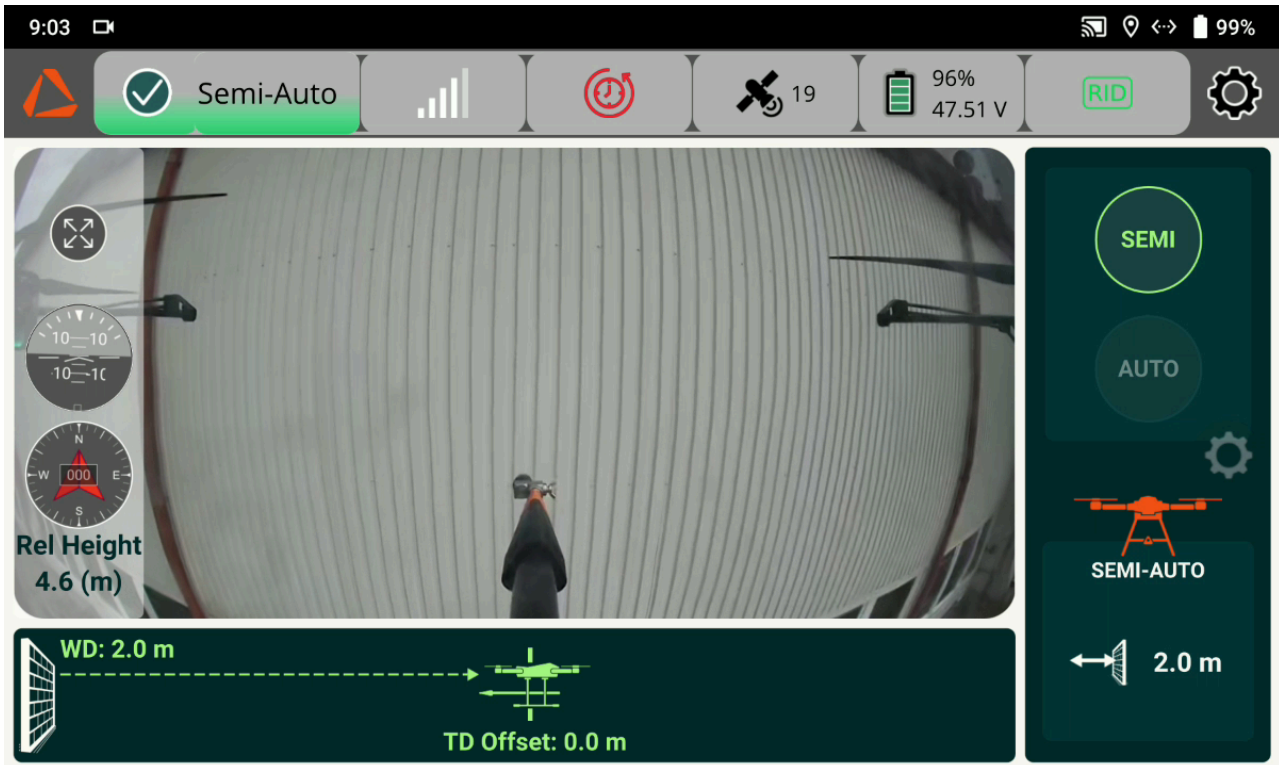
Parameter	Description	Recommended Value
Semi Auto Mission settings		
Target Distance	The desired distance between the radar and the wall.	Minimum 1.6 meters (63 in) Maximum 5 meters (5.47 yards).
Emergency Push	The distance from the wall at which the system does the Emergency push.	min: 0.0 meter (0.0 yard) max: 1.3 meters - 4.7 meters (4.3–15.4 ft) This value must not be more than the Target Distance. The difference between the two values must be a minimum of 0.3 m (1 ft). (Recommended difference: 0.5 m/1.6 ft)
Auto-Pilot Settings:		
Height:	The height of the vertical routes.	Min. 2 meters (79 in) Max. 60 meters (66 yd)
Width:	The horizontal distance that the drone moves between the vertical routes.	Minimum: 0.1 m (4 in) Maximum: 1 m (39 in) Recommended range: 0.4- 0.6 m (16–24 in)
Speed:	The flight speed for the vertical auto mission	Minimum: 0.3 m/s (1 ft/s) Maximum: 1 m/s (3.3 ft/s) Recommended values: 0.4 m/s (1.3 ft/s)

The distances are measured from the radar, not from the tip of the lance!

Operational Workflow - Semi-Auto Mode

Initial Positioning and Takeoff

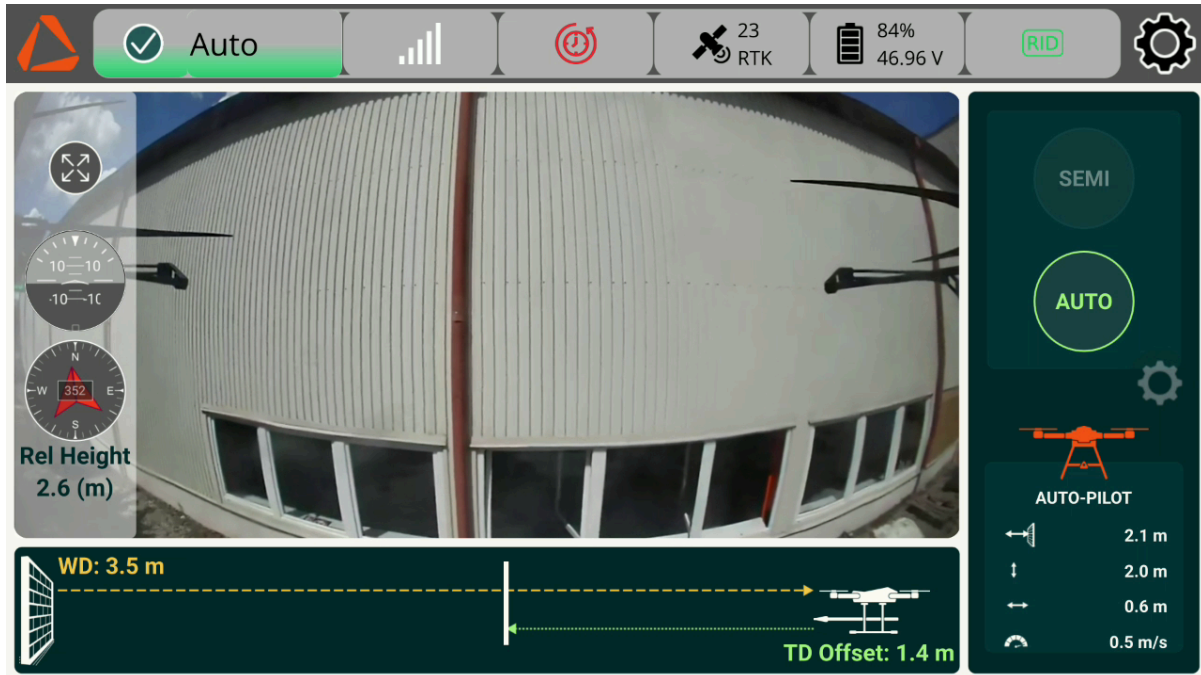
1. Configure the Target Distance Settings.
2. **Manual Takeoff:** Always perform takeoff manually and stabilize the drone at a height of at least **2 meters (6.6 ft)**.
3. Navigate the drone to a **TD Offset (target distance offset)** of at least **2 meters (6.6 ft)**.
4. Turn on the Semi-Auto Mode by clicking the Virtual Button in the Auto-Pilot Panel.



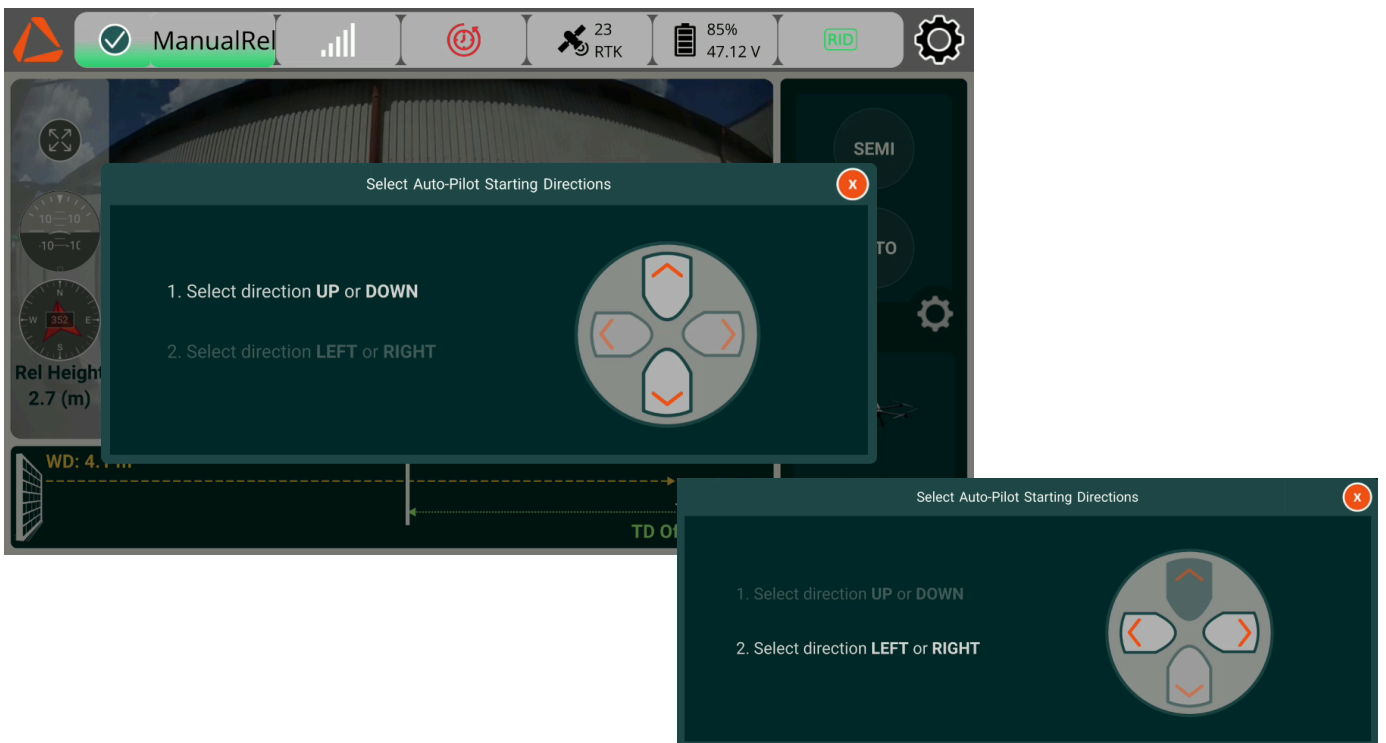
Operational Workflow - Vertical Auto Mode

Initial Positioning and Takeoff

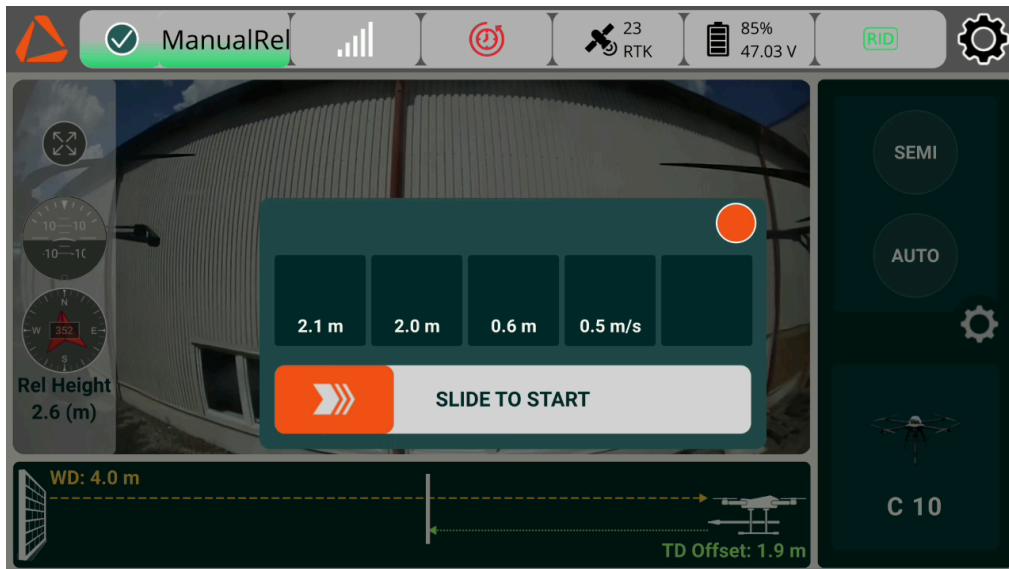
1. Configure the Auto-Pilot Settings.
2. **Manual Takeoff:** Always perform takeoff manually and stabilize the drone at a height of at least **2 meters (6.6 ft)**.
3. **Starting point Selection:** Position the drone at either the **top-most** or **bottom-most** point of the intended cleaning area.
4. Navigate the drone to a **TD Offset (target distance offset)** of at least **2 meters (6.6 ft)**.
5. Turn on the Auto-Pilot by clicking the Virtual Button in the Auto-Pilot Panel.



6. In the **Select Auto-pilot Starting Directions** window, define:
- a. If the vertical movement starts **up** or **down**.
 - b. If the horizontal movement goes **left** or **right**.



4. Confirm the entered mission parameters in the pop-up window, then slide the slider to start the mission.



Executing the Vertical Mission

- Once the **Auto-Pilot mode** is activated, the drone will begin its vertical strokes.
- **Horizontal Movement:** After completing a vertical stroke, the drone will perform a lateral step before beginning the next vertical pass.
- To **pause** the mission, select the manual mode with the 'A' button or pull the pitch stick (the right stick) fully rearward.

Interrupting the Vertical Mission

In scenarios where the pilot must halt the automated movement (e.g., encountering an obstacle or reaching a mid-point):

- **Manual Override:** Pull the **pitch stick (right stick) strongly backward** to force the drone away from the wall.
- Press **Button A** on the remote controller to immediately switch to **Manual mode**. This allows the pilot to manually maneuver the drone sideways or away from the surface while maintaining full control.

Resuming the Vertical Mission

- **Note:** The system does not have a 'Continue Mission' function. If an interruption occurs (for example, a battery replacement):
 1. **Manually** fly the drone back to the location where the mission stopped.
 2. Complete the remaining vertical movement of the last section in **semi-automatic** mode, or complete the upcoming horizontal movement, and restart the mission. The mission always starts with vertical movement.
 3. Alternatively, if you use the automatic mode to complete the vertical movement, you must stop the drone manually when it gets to the boundary of the work area. To stop the drone, select the manual mode with the **'A' button** or **pull the pitch stick (the right stick) fully rearward**, and restart the Mission.

Finishing the Mission

- The system has no “End Mission” function. **The pilot must manually stop the drone and move it back to the launch point.** To stop the drone, switch to manual mode using the **“A” button** or **pull the pitch stick (right stick) fully rearward**.

Key Auto-Pilot System Functions:

Emergency Response & Error Handling:

If the drone detects an abnormal operation—caused by a software error, hardware failure, or operational mistake—it will immediately alert the pilot. In the event that an internal system component fails to function as expected, the (semi)automatic distance control will be deactivated. Possible causes of such failures include:

- A damaged radar sensor
- A faulty internal component

If an anomaly is detected—caused by a hardware/software interruption (e.g. damaged radar or faulty part) or Operational interruption (e.g. measuring past the edge of a wall) —the system will return to Manual Flight Mode.

An operational interruption may occur due to an emergency caused by **pilot error** or a **sudden environmental change**. Depending on the severity and urgency of the failure, the drone may either perform an autonomous motion override or return full control to the remote pilot.

- **Drone approaching the surface/an obstacle at a critical distance**

Interruption: If the drone gets too close to the surface due to sudden external factors (e.g., gusts of wind), or detects an obstacle (such as a protruding surface element) within the defined Emergency Push distance (set under Settings > Payload), it will automatically push backward at maximum speed until it reaches 2 meters (6.6 ft), then disable (Semi-)Auto Mode and switch to Manual mode.

You can set the Emergency Push distance in the Settings menu in the Auto-Pilot Panel. The Emergency Push distance can be adjusted between 1.6 and 5 meters (5.3–16.4 ft), but it cannot exceed the Target Distance. The minimum difference between the two values is always 0.3 meters/1 ft (a recommended difference is 0.5 meters/1.6 ft).

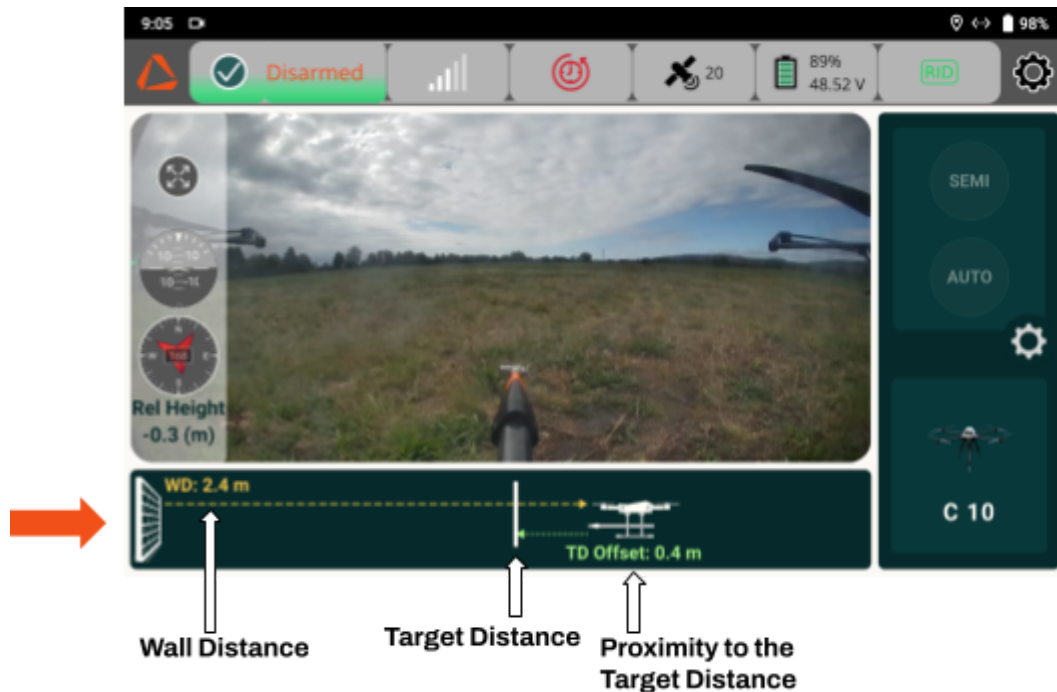
- **Radar drift causes false distance readings when near the edge of the wall surface**

Interruption: The automatic distance control will shut off, and return to Manual flight mode

- May detect and respond to potential pilot errors to reduce the risk of collisions.

IMPORTANT: Strong and unpredictable wind gusts or turbulence may occur near building edges. These conditions can cause abrupt or unstable drone movements that must be carefully managed by the pilot.

During flight, the Distance Display bar helps you determine the correct starting operational distance from the wall. The right edge represents the wall, and a thin strip in the middle indicates the target distance.



As you pilot the drone, the Wall Distance line will change color to indicate your position relative to the Target distance.

- **Red:** The drone has exceeded the Target Distance.
- **Yellow:** The drone is getting closer to the Target Distance.
- **Green:** The drone is within ± 0.2 meter (8 in) of the Target Distance.

Once the drone reaches approximately 5 meters (16.4 ft) from the surface, the pilot can give the designated hand signal, and the helper or supervisor should start the high-pressure washing system.

When the target distance offset is under 2 meters (6.6 ft), you can activate the semi-automatic or auto-pilot function.

Challenges Posed by Irregular Surfaces

The drone's onboard radar and positioning systems rely on consistent, reflective surfaces to accurately determine distance and orientation. If the target surface is irregular—such as leaky, broken, or incomplete walls—it may scatter or absorb radio waves, resulting in poor signal return and degraded positional accuracy.

Key Issues:

- **Low Reflectivity:** Surfaces that do not reflect radar signals effectively (e.g., porous materials, holes, gaps) reduce navigation precision.
- **Signal Noise:** Structural irregularities may introduce interference or false readings.
- **Weakened Radar Stability:** Fragmented or uneven surfaces compromise the reliability of distance measurement.

If radar-based control is unreliable due to surface inconsistency, turn off the automatic distance control, and switch to manual flight mode to continue the operation.

Important: Manual operation should only be attempted by experienced pilots who are familiar with proximity-based flight controls and obstacle avoidance.

Washing system operation

Operating the C10 drone with the high-pressure washing system is a two-person job requiring a Pilot and a Helper/Supervisor. Seamless coordination between both team members is essential for ensuring a safe and efficient cleaning process from start to finish.

Roles and Responsibilities

Pilot: is responsible for controlling the drone's flight and uses standardized hand signals to communicate with the Helper or Supervisor.

Helper/Supervisor: operates the high-pressure washing system, turning it ON and OFF as needed. They also manage and adjust the high-pressure hose and observe the environment to support safe drone operation.

Operational procedure

For optimal positioning of the drone, **mark a 6-8 meter (20–26 ft) wide section of the wall to be washed and position the hose system in the middle of that section** on the ground. **Keep the drone within a +/- 3-4 meter (9.8–13.1 ft) horizontal range from the ground system's position** as you move up and down the washing area.

Once a section is complete, power down the drone, then reposition both the drone and the hose system to the center of the next 6-8 meter (20–26 ft) section before resuming operation.

1. Preparation

- Before any flight, conduct all required [pre-operation safety checks](#) (see page 61) to ensure the operational readiness of the drone, equipment, and the safe operational zone and environment.
- Clearly assign the roles of Pilot and Helper/Supervisor and review the standard hand signals for communication.

2. Hose Setup

It is critical to position the high-pressure hose strategically to ensure free water flow and give the drone maximum maneuverability.

The high-pressure hose must be free of lumps, kinks, and overlaps that could restrict water flow or snag during flight.

Before starting the system, vent all hoses to purge any trapped air.

Important: To allow for unrestricted water flow and optimal maneuverability, try to position the high-pressure hose in a pattern that avoids sharp bends and allows it to move freely.



The hose should be placed at the base of the surface to be washed (maximum width: 6–8 meters/ 20–26 ft), preferably centered, to minimize lateral pull on the drone.

3. Flight and Cleaning Operations

- During ascent, the Helper/Supervisor should stand by, carefully monitoring the high-pressure hose to ensure it feeds out smoothly without interfering with the drone.

When moving the hose with a strong force, move the drone forwards/backwards only. In case of sideways pulling, the counter-force of the hose will force the drone to rotate, which may pose a safety hazard.

- Once the drone reaches approximately 5 meters (16.4 ft) from the surface, the pilot can give the designated hand signal, and the helper or supervisor should start the high-pressure washing system.
- With the drone in a perpendicular position, carefully approach the target surface until you are 1 meter (3.3 ft) beyond the predefined desired distance (target distance).
- Turn on the (Semi)-Auto mode. For further information about configuring and executing a [Vertical Auto Mission](#), see page 51.
- You can start the operation.

4. Concluding the Operation

1. To begin the landing process, switch to **Manual** mode by pulling the **pitch stick (right stick) firmly backward** to move the drone away from the wall, or press Button A on the remote controller to immediately switch to Manual mode.
2. Fly to a safe distance from the wall before proceeding to switch off the washing system.

After switching off the Washing System, the drone may slide forward 0.5 to 1 meter (1.6–3.3 ft) due to the sudden loss of counterforce.

3. The Helper/Supervisor can turn off the high-pressure system.
4. During landing, the Helper/Supervisor must ensure the high-pressure hose is safely arranged on the ground to prevent any obstruction or entanglement during the drone's descent and landing.

Below a height of 20 cm (8 in), the drone should only be moved downward—not forward, backward, or sideways—as any lateral movement may pose a safety risk.

Flight

If needed, check Failsafe settings and adjust them according to the actual flight task and surroundings.

Set the display brightness in accordance with the lighting conditions. Every data on the display should be readable even in direct sunlight. Turn off unnecessary nearby Wi-Fi and radio equipment to minimize interference.

If all the necessary conditions for the flight are ensured, you can then enter the Flight view to start the flight, switching to "Armed" mode.

Make sure that the RTK correction is ON:

Do NOT fly near buildings without RTK Correction.

If any flight system errors occur during the flight, the controller shows a pop-up message with information about abnormalities.

In emergency situations, the pilot must operate the drone manually in the safest available manner, specifically taking care of personal and property security. The pilot must fly the drone away from potential risks, applying careful, slow stick inputs and flight speeds, find a safe area, and land the drone with a slow descent rate.

Loss of navigation systems

If the GPS system fails during flight, the "GPS glitch" pop-up message will be shown on the screen, and the pilot must land the drone.



If a total failure of the navigation system occurs, the drone automatically does a controlled descent and landing. In land mode, the pilot can only give forward, rearward (pitch), left, and right (roll) stick inputs to make sure that the landing is safe.

In case of a „Potential thrust loss” message, the pilot must land the drone as soon as possible, operating it with slow and smooth motion.

Brake mode

When you fly in **Altitude Hold** mode with the **Geocage** enabled, in rare scenarios, the drone can cross the boundary of the **Geocage**. **This activates a safety protocol that switches the drone to Brake mode, and the drone stops at the boundary of the Geocage.**

In **Brake mode**, the drone does not respond to control stick inputs, and you cannot activate the **Return to Launch** mode. To exit **Brake mode**, the pilot must switch to **Manual (Button A)** mode to get full control.

Flight Protocol and Checklists

Before flight, tasks and inspections

- Determine the flight location.
- The task to be performed is properly analyzed.
- Permits applied for and obtained.
- Visual inspection of the area performed
- Inspect the surface to be cleaned: If the wall surface is leaky, broken, or incomplete, radar signal stability may be reduced.
- The operational area is secured
- The obstacles in the built environment identified
- Neighbours and other limiting factors identified
- Tools and accessories needed for the work are prepared.
- The pilot is fit and ready to work.
(IMSAFE: Illness, Medication, Stress, Alcohol, Fatigue, Eating)
- Set the remote controller's sound volume according to the ambient noise.
- Set the remote controller's display brightness according to ambient light conditions.

Pre-arming tasks and inspections

- The meteorological conditions are below the limits of the type AND nature of the activity: temperature, visibility, rain, wind speed, etc.
- Optimum conditions: operation in calm conditions, possibly with light, steady winds.
Recommended wind strength: < 30 km/h (19 mph)
- General visual inspection and condition assessment of the drone. General inspection: cables, connections, video connection, payload, etc. Payload condition, arms, base structure condition, and whether the bolts are properly tight.
- Condition of blades: clean, not broken, not cracked, no other damage. Visual inspection of the blades, paying special attention to possible mechanical damage and whether the propellers are properly fastened.
- Condition of motors: The coils are copper-colored, not black, no burnt smell, no great resistance when turning by hand, rotation is continuous, not chunky
- Condition of arms: properly secured, not broken or cracked, all fasteners (screws, rivets) in place
- Landing gear condition: not broken, not cracked, not warped, the drone is stable on the landing gear, the landing gear does not wobble on a flat surface. The landing gear and any accessories are securely fastened.
- Washing rod fitted and fixed in place.

- The washing system has been connected to the water source and, if necessary, to the mains electricity supply.
- The high pressure hose is connected to the drone.
- Hose entanglement during flight is a safety hazard. The hose should always be free of knots, and free to move in any direction. The high pressure hose is properly aligned, 6-8 m (20–26 ft) working width, free to move and free from knots.



- The remote control antennas are properly adjusted.
- The drone is placed on level ground, away from metal surfaces.
- Checking the batteries: no swelling, correct voltage, properly secured. All batteries charged and checked: radio station, drone, video equipment, and accessories.
- Drone battery status:
(The state of the drone battery should be monitored before the flight using the charging indicator LEDs on the battery. We recommend starting the flight with a minimum of 80% battery charge).
- Unfold the drone's arms and tighten the fasteners.
- Unfold the propellers symmetrically.
- The remote controller is switched on and correctly set. The remote controller must ALWAYS be switched on before the drone battery is connected.
- Check the radio, telemetry, and video antennas.
- Check the remote controller's battery status, charge level.
- Check the live telemetry data on-screen, check button functions.
- NEVER leave batteries connected for prolonged periods.
- Before arming the drone, leave enough free space, stand at least 20 meters away from it.
- Perform compass calibration if necessary.
- Check the video signal on the display.
- Make sure the device has enough satellite connections.
- Check that the devices installed are working properly.
- Make sure that the task you have chosen is the one you want to carry out, is planned, and properly analyzed.
- Whether the take-off zone is sufficiently cleared.

Post-arming tasks

- 6–8 meter (20–26 ft) wide work area designated.
- The remote control battery is sufficiently charged.
- The drone's battery is sufficiently charged.
- Camera image check, camera image available.
- Drone is position visible.
- Geofence and Maximum Altitude correctly configured.
- The hose is vented.

Pre departure tasks

- Checking the area before take-off, taking into account possible environmental hazards
- All switches in the correct position before take-off
- Washing system is turned off
- External persons and persons involved in the operation are safe.
- Arm the drone and take off.

After take-off and in-flight tasks

- Stabilize and hold the drone at a height of at least 2m (6.6 ft).
- Test the left and right rotation functions, forward/reverse movements, right, left tilting.
- Check that the drone is stable and that there are no abnormal vibrations.
- Blades operate smoothly
- The drone is stable in the air (GPS)
- The drone works according to the instructions issued
- Flight data in order (Battery charge, Altitude, Speed, Heading, GPS connection)
- The drone is stable during flight near the surface to be cleaned.
- High pressure washer operation OK

Preparing to operation

- Target Surface at a safe distance (7-10 m / 23–33 ft)
- High pressure system is turned on

Activating the automatic distance control

- Approach surface to the Target distance (target distance) +1m (3.3 ft)
- Turn on the automatic distance control (virtual SEMI or AUTO Button in the Auto-Pilot Panel)

During operation

- If the drone or remote controller battery is low, land the drone in a safe place.
- During the flight, the pilot must monitor the battery voltage, which should always be above 43.5 V, even when flying with the Maximum Take-off Mass (MTOM).
- When the battery voltage level drops under 43.5 V, start returning and landing the drone. If, during the return, the battery voltage reaches the low or critical threshold (42.5 V and 42 V), the drone will automatically initiate the battery failsafe procedures.

After operation

- Turn off the the (Semi)-Auto Mode (move the pitch stick (right stick) firmly backward or press Button A)
- Target surface at a safe distance (7-10 m / 23–33 ft)
- Turn off the washing system
- Check the flight altitude and the maximum allowed distance.

Start landing, tasks and inspections

- Ensure that the (Semi)-auto Mode is turned off.
- If necessary, pre-adjust the hose.
- The people involved in the operation - and, external persons are safe

After landing, tasks and inspections

- Switch off professional equipment if necessary.
- Switch off the drone by unplugging the battery from the connector.
- Switch off the remote controller.
- Clean the drone thoroughly (batteries, tools, camera, etc.).
- Disassemble, clean, check, and store all professional equipment properly.
- In the flight log, record the flight and any significant events. Accurate completion of this document is mandatory to monitor the operation and lifetime of the drone, and to facilitate properly scheduled servicing (every 300 flight hours).
- Record the nominal voltage remaining in the batteries used. After returning from the field, remove the batteries from the storage box and store them in a cool and well-ventilated place.
- DO NOT STORE batteries overcharged or fully discharged for extended periods of ti

Checklists

Before first take-off

- General structural, mechanical inspection
- Inspection of propellers one by one, even if there is only minor damage, takeoff is prohibited.
- Tightness of the drone arms' fasteners
- Propellers in an unfolded state
- Visual inspection of the area performed
- Inspect the surface to be cleaned: If the wall surface is leaky, broken, or incomplete, radar signal stability may be reduced.
- Switch on the remote controller, and launch the ABZ Control app.
- When ABZ Control is waiting for the connection, turn on the drone by connecting the battery (the plug must be fully plugged in).
- If you are operating the drone in a country where the remote identification of drones is mandatory, verify in an appropriate application that the Dronetag is correctly broadcasting your drone operator ID before take-off ([see page 15](#)).

Before every take-off

- Drone battery charge level. The state of the drone battery should be monitored before the flight using the charging indicator LEDs on the battery. We recommend starting the flight with a minimum of 80% battery charge.
- Remote controller battery charge level
- When ABZ Control is waiting for the connection, turn on the drone by connecting the battery (the plug must be fully plugged in).
- Check the connection between the remote controller and the drone.
- Verifying **Telemetry** live data (in case of failure, ABZ Control must be restarted).
- Whether the drone is in **Manual** (Loiter) mode (if not, press **button A** to switch).
- You are at a safe distance (at least 20 meters / 22 yd) from the drone.
- The high pressure hose is connected to the drone.
- The hoses are knot-free and properly aligned.
- Switch to "Armed" mode by pushing the **left control stick** to the **down-right position**, until „Armed“ is shown on the display, then release the stick.
- After arming the drone, wait about 4 seconds for the motors to reach full speed before take-off.
- Take off to a safe height (at least 2m / 6.6 ft).

After take-off

- Compass adjustment by a single 360° rotation around the vertical axis of the drone
- Check the stability and motion of the drone.
- Check the **battery status** and **voltage** frequently during flight.
 - If the drone or remote controller battery is low, land the drone in a safe place.
 - During the flight, the pilot must monitor the battery voltage, which should always be above 43.5 V even when flying with the Maximum Take-off Mass (MTOM). When the battery voltage level drops under 43.5 V, start returning and landing the drone. If, during the return, the battery voltage reaches the low or critical threshold (42.5 V and 42 V), the drone will automatically initiate the battery failsafe procedures.
 -
- Land the drone carefully and at a safe descent speed.

Before landing:

- The drone is in Manual Mode.

After landing

- Switch to „Disarmed” mode by pushing the **left control stick to the down position**, until „Disarmed” is shown on the display and the motors are completely stopped.
- At the end of the flight, first switch off the drone and then the remote controller.
- The drone can then be folded for transport. Make sure that the arms’ fasteners are not in contact with the arm holder „C” clamps

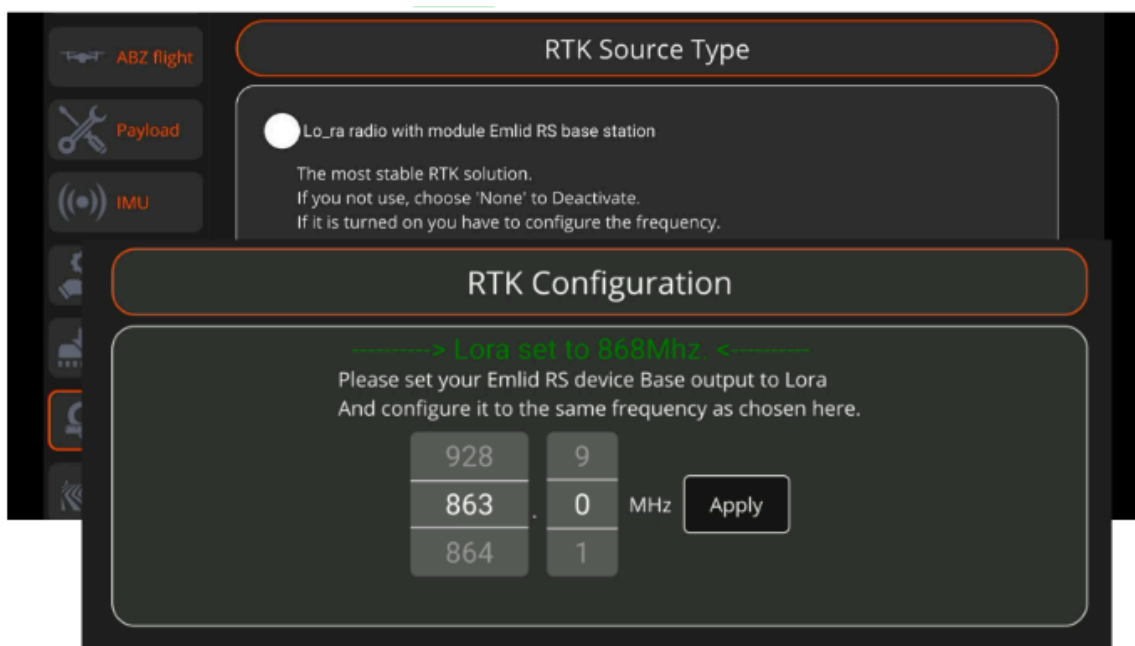
Emlid RTK

The C10 drone comes with the Emlid LoRa system^{6**}, which can be connected with Emlid RS+ or RS2+ RS3+ base stations for RTK positioning at centimeter precision.

An RTK base station is a high-precision GNSS (Global Navigation Satellite System) device used to provide real-time kinematic (RTK) corrections for enhanced positional accuracy. It works by receiving satellite signals and transmitting correction data to the drone.

Setting up the RS2+ or RS3 base is documented at Emlid's support pages:

- [Introduction | Reach RS3](#)
- [Introduction | Reach RS2/RS2+](#)
- If you connect to the RS2+ or RS3 base with **LoRa****, make sure it is configured to **Output: LoRa**, and that the frequency entered in the **Setting > RTK > Lora radio module Emlid RS base station** matches the Base output value specified in the Emlid flow app.

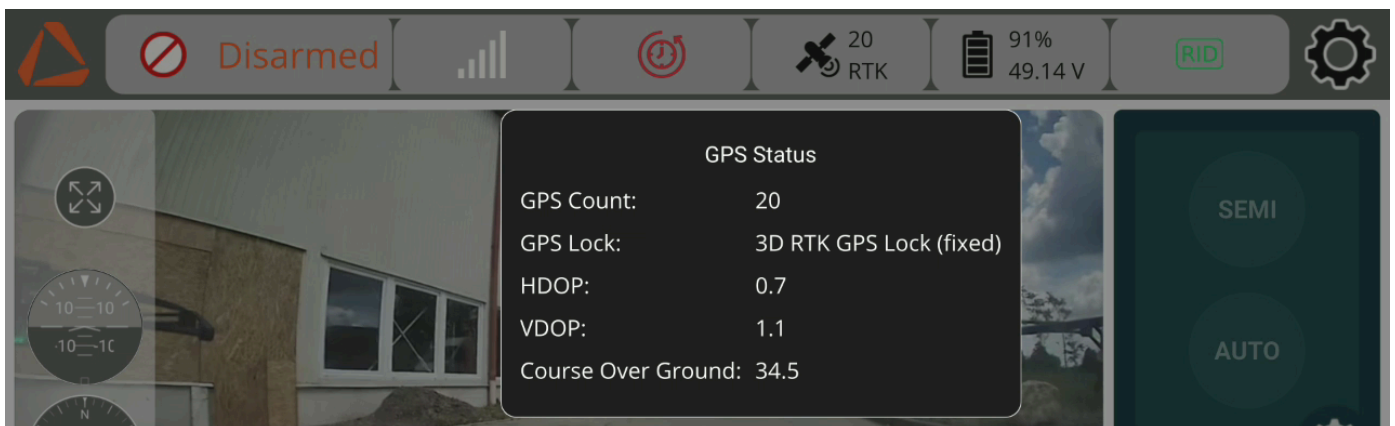


⁶ **The LoRa connection to the Emlid base station is only applicable for serial numbers ending in numbers below 00238 .

- If you connect to the RS2+ or RS3 base with **Local NTRIP**, set the base output to **Local NTRIP**.
 - Connect the controller to the hotspot of the base station with the credentials given in the Emlid Flow application.
 - In ABZ Control, in **Settings > RTK > Network RTK**, enter the NTRIP credentials that are given in the Emlid Flow application.
- If you connect to the **RS2+ or RS3** through the Emlid Caster, set the Base Output to **NTRIP**. Connect the Remote Controller to the internet with a hotspot, and enter the Credential from **Emlid Caster** in **Settings > RTK > Network RTK**.
For more information about the Emlid Caster, refer to emlid.com/ntrip-caster/.

When the system is set up and working correctly, on the drone's controller the GPS Status shows the following based on the accuracy:

- GPS Lock – RTK float
- GPS Lock – RTK fixed



Batteries and chargers

Battery:

Only use batteries purchased directly from ABZ Innovation distributors! This ensures safe operations, full compatibility, appropriate data connection to the drone. Using 3rd party batteries void the drone's warranty.

General informations about the battery:

- 44,4 V nominal voltage
- 16000 mAh capacity
- 15C discharge value
- 12 Cells

Charger:

Only use the original ABZ Smart Charger 3000! This ensures safe charge, full compatibility, appropriate data connection to the batteries. Using 3rd party chargers void the batteries' warranty.

- Power output: max. 60A/3000W
- Power Input: 16A/110-230V
- Capable of multiple charges at the same time
- Slow, Normal, Fast charge speed options
- Storage mode option

For continuous drone operation, use a set of four batteries. You can charge two batteries simultaneously while operating the drone with the remaining two (one active and one standby). On the field, charge two batteries simultaneously. To ensure long battery life, we highly recommend using balance charging. Also, let the batteries rest after charging before using them.

Payloads

The C10 is only approved to be used with the payloads provided by the ABZ Innovation.

The operator is solely liable for using only properly secured, correctly connected payloads, accessories, which are approved and compatible for drone use.

It is the pilot's responsibility not to exceed the maximum combined accessories and batteries and payload weight, which is 13,15 kg (29 lb) , thereby not to exceed the MTOM with the fully equipped drone, which is 24,9 kg (55 lb).

The payloads must not significantly affect the drone's center of mass, especially, when a heavy payload is mounted. It is highly recommended to install the payloads as close as possible to the drone's center.

Troubleshooting

If any malfunction is experienced, contact an ABZ Innovation service center for further instructions. No repair attempts are allowed by the pilot or operator.

abzinnovation.com/authorized_services/

Replacement parts

Only original replacement parts are qualified, directly from ABZ Innovation.

There are no life-limited parts of the drone, however propellers and motors must be inspected frequently, and in case of abnormalities, replacement is needed.

Other than replacing the propellers and the battery, every repair or replacement should be carried out only at an official ABZ Innovation distributor's service center by a trained and qualified technician.

Never repair any parts of the drone while it is powered on.

List of spare parts and part numbers:

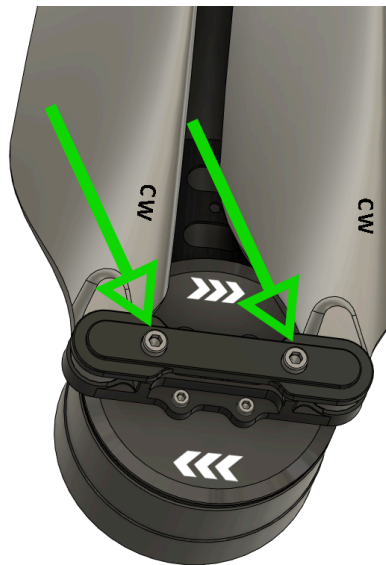
- Smart Battery for L10/S20/M12/C10 drone: A001402.01
- ABZ Prop Guard for the C10: A001425.01
- Platform10 Propeller blades CW (for one motor, without clamp): M001233.01
- Platform10 Propeller blades CCW (for one motor, without clamp): M001234.01
- C10 High Pressure Hose with M22-M22(x1.5) fittings 30m: A001175.01
- C10 High Pressure Hose with M22-M22(x1.5) fittings 60m: A001176.01
- ABZ Spray lance for C10: P001420.01

For spare part inquiries, contact ABZ Innovation Support.

Replacing the propellers:

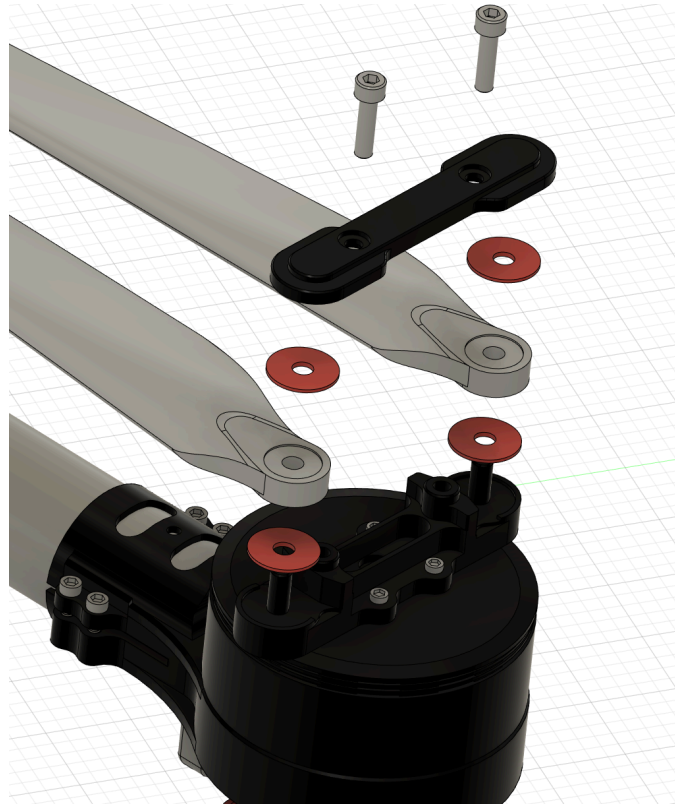
Tools for replacement:

- HEX 4 key
- Threadlocking fluid (e.g. Loctite 243)
- Original ABZ Innovation C10 propellers



Carefully check the motor and propeller rotational direction. On the motors it is indicated with arrows, on the propellers „CW” or „CCW” are indicated.

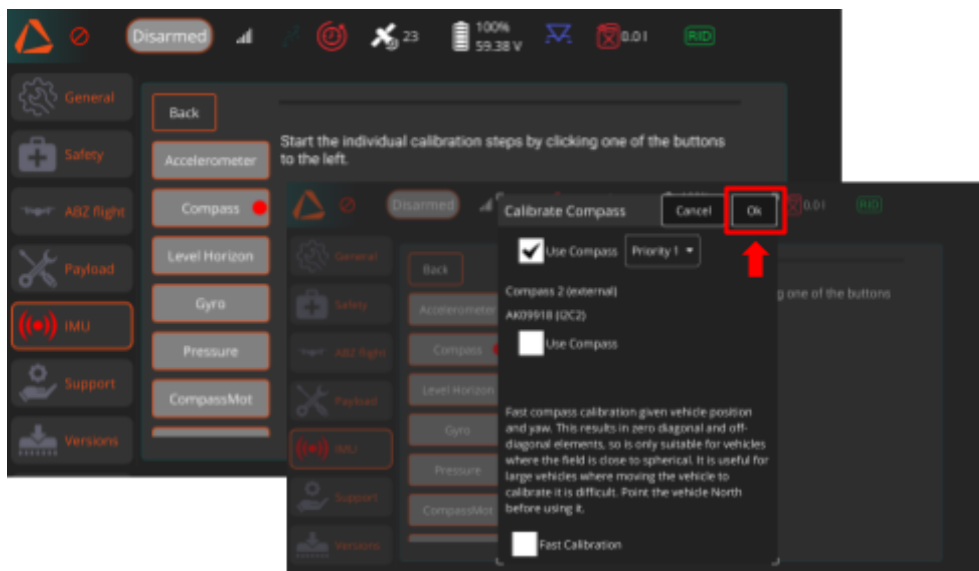
Unscrew the two 4mm HEX screws, disassemble the fixing cap of the propellers, remove the propeller's upper washers, remove the propellers and install new propellers, reinstall the upper washer and fixing cap. Clean the 4mm HEX screws from threadlocking residues and apply new threadlocking material (according to the manufacturer's instruction). Tighten the screws until the propellers have zero axial and radial play, but still easy to fold and unfold them.



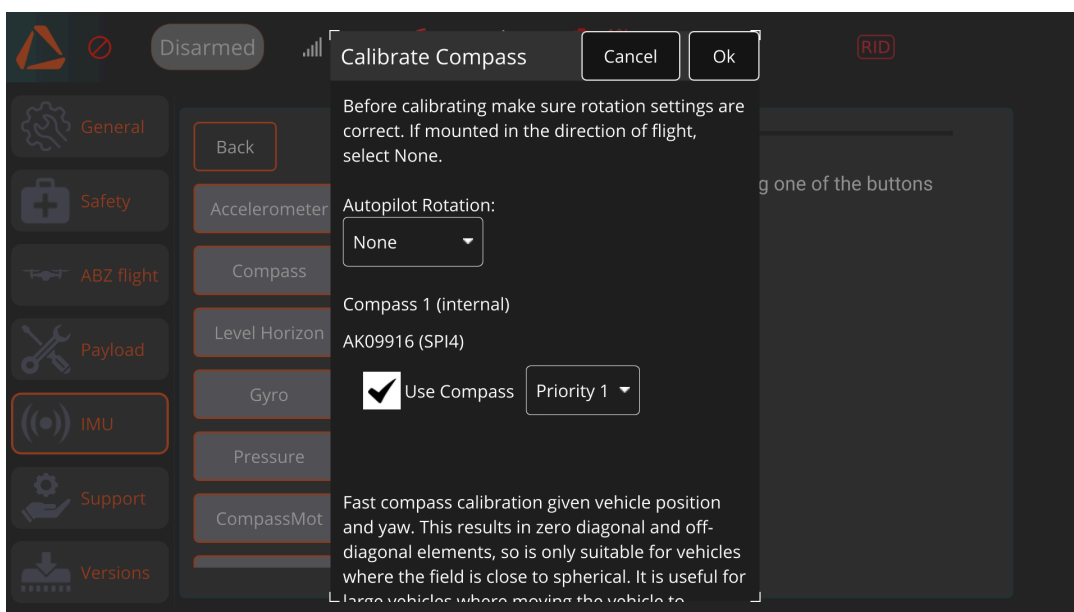
Obtain disposal information directly from local ABZ Innovation Distributors or Resellers. Always follow local regulations regarding disposal and recycling. If a part has ended life cycle or faulty/broken, it must be ensured not to be allowed to be used again, which can be carried out by an ABZ Innovation Distributor or Reseller.

Compass calibration

Compass calibration can be performed under **Settings > IMU > Compass**.

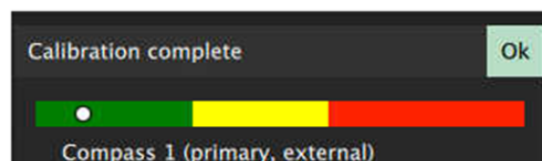


Make sure the settings match the photo below.



The calibration should only be performed if requested by the software or instructed by the Support Center. Do NOT use Fast calibration!

- The drone must be turned on, in „Disarmed” state.
- Remove any metal (e.g. keys, coins) and electronic objects from your pockets.
- The calibration sequence is initiated by pressing the "OK" button.
- Hold and Rotate the drone by hand 360° around all axes, and in both rotational directions
- Until the status bar is complete (usually a 1-2 minute operation).
- The result of the calibration is shown by the calibration quality feedback:



- Green: good quality calibration -> **Only green means successful calibration!**
- Yellow: medium quality calibration, consider recalibrating
- Red: not acceptable; please recalibrate

After the calibration is complete, do NOT press the Restart button on the interface. Instead, click OK. Wait for the green progress bar to finish loading, then restart the drone by powering it off and on using the battery button (short press followed by a long press).

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If you have any questions, please contact us: support@abzinnovation.com

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